ADICCIONES

ISSN / 0214-4840
E-ISSN / 2604-6334

PUBLISHED BY:
SOCIDROGALCOHOL
Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías

FUNDED BY:
MINISTERIO DE SANIDAD
SECRETARÍA DE ESTADO DE SANIDAD
DELEGACIÓN DEL GOBIERNO PARA EL PLAN NACIONAL SOBRE DROGAS

ADICCIONES

PUBLISHED BY:
SOCIDROGALCOHOL
Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías

FUNDED BY:
MINISTERIO DE SANIDAD
SECRETARÍA DE ESTADO DE SANIDAD
DELEGACIÓN DEL GOBIERNO PARA EL PLAN NACIONAL SOBRE DROGAS

SEND CORRESPONDENCE TO: SOCIDROGALCOHOL ■ Avda. de Vallcarca, 180 ■ 08023 Barcelona
(+34) 932103854 ■ revistaadicciones@socidrogalcohol.org ■ www.socidrogalcohol.org

ISSN: 0214-4840 ■ **E-ISSN:** 2604-6334 ■ **SVPF:** 89010R ■ **LEGAL DEP.:** V-1543-1989

INDEXED IN: SOCIAL SCIENCES CITATION INDEX (SSCI-JCR), SCIENCE CITATION INDEX EXPANDED (SCIE-JCR), EMBASE, SCOPUS, MEDLINE, PSICODOC, PSYCINFO, IBECS, ÍNDICE CSIC, LATINDEX, REDALYC, INDEX COPERNICUS, PROQUEST, DIALNET, GOOGLE SCHOLAR, WEB OF SCIENCE (WOS).

2025 ■ VOL. 37 ■ N. 1
ADICCIONES

INDEX / ÍNDICE

EDITORIAL

ORIGINALS / ORIGINALES

LETTER TO THE EDITOR / CARTA AL EDITOR

PUBLISHED BY:
SOCIDROGALCOHOL
Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías

FUNDED BY:
MINISTERIO DE SANIDAD
SECRETARÍA DE ESTADO DE SANIDAD
DELEGACIÓN DEL GOBIERNO PARA EL PLAN NACIONAL SOBRE DROGAS

ADICCIONES

SOCIDROGALCOHOL
Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías

BOLETÍN DE SUSCRIPCIÓN

■ DATOS PERSONALES:

Nombre y apellidos .....

NIF..... Profesión .....

Dirección ..... Nº ..... Piso .....

Tel. ..... Población ..... C.P. ..... Provincia .....

E-mail .....

■ SUSCRÍBANME A: *ADICCIONES*. AÑO 2025

España	4 ejemplares y suplementos	50,00 €		suscripción particular
	4 ejemplares ,,	130,00 €		suscripción instituciones
	1 ejemplar	15,00 €		
	1 monográfico	20 €		
Extranjero	4 ejemplares y suplementos	90 €	90 $	suscripción particular
	4 ejemplares ,,	200 €	200 $	suscripción instituciones
	1 ejemplar	19 €	19 $	

Las suscripciones se entenderán por los cuatro ejemplares del año natural en que se realice la suscripción, sea cual sea el momento del año en que ésta se efectúe.

■ PAGARÉ:

A) **Por domiciliación bancaria (rellenar para ello la orden de pago que está a continuación y enviarnos el original por correo).**

B) Mediante cheque nº. ..... que adjunto a nombre de «Adicciones».

C) Transferencia bancaria a BANCO SABADELL ATLÁNTICO - Ag. Ganduxer, Vía Augusta, 246 - Barcelona
IBAN: ES81 0081 0653 7300 0116 0017
(Es importante que en la orden de transferencia conste claramente el ordenante de la transferencia para poderla identificar adecuadamente).

..... *de* ..... *de 20* .....

(Firma)

ORDEN DE PAGO POR DOMICILIACION BANCARIA

Nombre del titular de la cuenta .....

Nombre del Banco o Caja de Ahorros .....

Número Cuenta Corriente o Libreta **(ATENCIÓN: DEBE CONSTAR DE 20 DÍGITOS):**

Entidad ☐☐☐☐ *Oficina* ☐☐☐☐ *D.C.* ☐☐ *Nº* ☐☐☐☐☐☐☐☐☐☐

Dirección Banco o C.A.:

Calle o Pza. .....

Código Postal ..... *Población* ..... *Provincia* .....

Ruego a Vds. Se sirvan tomar nota de que, hasta nuevo aviso, deberán adedudar en mi cuenta los efectos que les sean presentados para su cobro por "Adicciones, Socidrogalcohol"

..... *de* ..... *de 20* .....

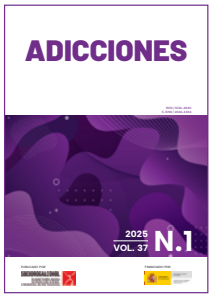
Atentamente (firma del titular)

ENVIAR ESTE BOLETÍN A: SOCIDROGALCOHOL ■ Avda. de Vallcarca, 180 ■ 08023 Barcelona
(+34) 932103854 ■ revistaadicciones@socidrogalcohol.org ■ www.socidrogalcohol.org

LA REVISTA ES GRATUITA PARA LOS SOCIOS DE SOCIDROGALCOHOL

SOCIDROGALCOHOL
Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías

ADICCIONES
2025 ■ VOL. 37 ■ N. 1 ■ PAGES 3–6
www.adicciones.es



EDITORIAL

The current state of gambling advertising in Spain and its potential risks

El estado actual de la publicidad de los juegos de azar en España y sus riesgos potenciales

Juan F. Navas*; José C. Perales**.

* Dpto. de Personalidad, Evaluación y Psicología Clínica. Universidad Complutense de Madrid.

** Departamento de Psicología Experimental. Centro de investigación Mente, Cerebro y Comportamiento (CIMCYC). Universidad de Granada.

In April 2024, Spain's Supreme Court partially annulled the Royal Decree on gambling advertising (RD 958/2020) which had come fully into force in August 2021 and significantly restricted gambling advertising in Spain. The measures included in the Royal Decree sought to reduce and prevent harm from gambling. In particular, regulations of this kind aim to protect vulnerable populations, whether due to age, having developed a gambling addiction (i.e., gambling disorder), or other problems derived from gambling or any other cause of psychological, economic, or social risk. Among the most significant measures of this Royal Decree are banning sports sponsorship and print media advertising, restricting radio and television advertising to specific time slots (e.g., 1 am to 5 am for games of chance other than lotteries or bingo) and all online advertising, including welcome bonuses. It was only possible to access online gambling advertising on the express wish of the individual, for example, by opening an account with a gaming operator or by explicit acceptance via an external link, and after age-based filtering. The Supreme Court's ruling, while focusing on formal legal aspects rather than specific content, has fundamentally impacted this online advertising channel. It is thus currently allowed by law for anyone of legal age to be exposed to gambling advertising at any time and place, via any device connected to the internet, even if they do not wish to be.

Analyzing the impact of the Royal Decree's implementation and then its partial repeal is a complex task, as environmental prevention measures of this nature can operate at very different levels, and capturing their effect can take a long time (McGrane et al., 2023). Thus, the aim of this editorial is twofold: first, to summarise the scientific evidence supporting the argument that greater advertising restrictions are beneficial both for society as a whole and for the most vulnerable individuals, as they can contribute to reducing the harm caused by gambling; second, to remind everyone of the importance of strengthening other prevention measures, both at community and individual levels, at a time when Spain's regulatory framework is not

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Juan F. Navas. Dpto. Personalidad, Evaluación y Psicología Clínica. Facultad de Psicología. Universidad Complutense de Madrid. Campus de Somosaguas, Ctra. de Húmera, s/n, 28223 Pozuelo de Alarcón, Madrid. Email: junavas@ucm.es

clearly aligned with a prevention approach based on a public health model. From such a perspective, prevention should not be limited exclusively to reducing the harm suffered by individuals who develop an addiction, but should also address the harm experienced by all individuals who gamble (e.g., mild to moderate financial or emotional harm), third parties indirectly affected by the gambling of their loved ones, and the community at large (Browne et al., 2016). This reminder is also important because, away from the media spotlight, currently more focused on technology-based issues arising from mobile phones or video games, the concern of society and regulators with regard to gambling seems to have partially dissipated.

In contrast to the classic view of addiction that emphasizes individual factors, there is growing interest in the scientific literature and support for models of gambling disorder that focus on the interaction of individual and social vulnerability factors with the structural characteristics of the way games of chance are designed and marketed (Goudriaan, 2020; Navas et al., 2019; Yücel et al., 2018). These characteristics refer to elements of both the advertising and the intrinsic mechanisms of gambling, as well as the devices, platforms, and venues where bets are placed, and which influence behavioural parameters such as the intensity, frequency, density, or quantity of bets (Parke et al., 2016). Impulsivity, emotional regulation issues, or a socioeconomic context which limits access to resources for well-being and personal and professional growth are some examples of vulnerability understood from a biopsychosocial model applicable to gambling problems (Sharman et al., 2019).

In studies focused on the descriptive analysis of the structural characteristics of high-risk gambling, those gambling contexts stand out which feature a continuous, rapid experience in terms of the immediacy of the outcome, and which allow for a high frequency of betting opportunities (Parke et al., 2016). Gambling advertising, especially online advertising, can reinforce this type of gambling experience (Hing et al., 2022).

For a brief analysis of this issue, sports betting can be taken as an example. Furthermore, understanding this specific type of gambling is of interest to the scientific community in Spain in light of data from the latest national prevalence surveys. In 2023, the Dirección General de Ordenación del Juego (Directorate General for the Regulation of Gambling) reported that 12.45% of people aged between 18 and 25 years who used sports betting presented at least one symptom of addiction (DGOJ, 2023), often interpreted as a risky gambling pattern. Meanwhile, in its 2024 behavioural addiction report, the Plan Nacional Sobre Drogas (PNSD, National Plan on Drugs) also shows that some games of chance, including sports betting (i.e., as well as card games, slot machines, and roulette), are associated with an up to five times greater likelihood of developing addiction symptoms compared to lotteries and football pools.

For example, live sports betting combines the previously mentioned characteristics of continuity, immediacy, and high frequency by including the possibility of betting in real time on a large number of situations within a single sporting event (e.g., the outcome of a serve in tennis). In a descriptive analysis of gambling advertising, Torrance et al. (2021) highlight the over-promotion of specific information on sporting event odds alongside various types of financial incentive. The use of messages promoting access to and ease of gambling opportunities through various types of bonuses, real-time withdrawal options, and 'flash' offers can be particularly pernicious in generating gambling harm (Luquiens et al., 2022; Torrance et al., 2023). Moreover, their impact may be greater on adolescents and young adults (Torrance et al., 2021).

Gambling advertising in general has thus been associated with increases in gambling frequency and intensity among both novice and experienced gamblers (Lopez-Gonzalez et al., 2020; see McGrane et al., 2023 for a meta-review of articles from different countries around the world). When this advertising is delivered online, we must also consider the effects arising from the use of this channel. Firstly, high accessibility, affordability, and anonymity (Triple A Model; Cooper et al., 1999) favour greater contact with online gambling, as is the case with other potentially problematic technologies (Flayelle et al., 2023). Secondly, we must remember that accessibility is bidirectional. Not only do users have access to information and betting opportunities, but the operator also has the opportunity to interact with users. In this way, the information asymmetry between the provider and the bettor allows for the distribution of targeted advertising (based on the user's profile and behavioural history when betting, shared data, or data obtained from third parties) without the user necessarily being aware of the strategic use of their data (Davies, 2022). When this occurs with particularly vulnerable individuals, it increases the likelihood of impulsive gambling (McGrane et al., 2023) and, with it, the potential harm these individuals are exposed to, including a higher risk of developing an addictive disorder.

As an example of the effect of advertising on vulnerable populations, López-González et al. (2020) found, in a sample of people with gambling disorder under treatment, that the influence of emotional regulation difficulties and impulsivity on the severity of gambling-based problems is mediated by exposure to gambling advertising. Their data thus support the above-mentioned idea that advertising exacerbates and, therefore, exploits individual vulnerability, thereby increasing the risk of triggering problematic patterns of gambling use. Similar results can also be found in populations of young people and adolescents, a population at risk due to neurodevelopmental factors (Chambers et

al., 2003), and on whom gambling advertising can have a notable impact in terms of their attitudes towards gambling, risk perception, and even on the development of distorted ways of understanding how games of chance work (Deans et al., 2017; Pitt et al., 2017).

Clearly, the accumulation of scientific evidence regarding gambling advertising points to a harmful effect that should guide a regulatory policy based on caution (Miller et al., 2016). The starting point for evidence-based regulation should be to prioritise the protection of users in general, and the most vulnerable users in particular, in order to reduce the negative impact of this activity on society as a whole (Kesaite et al., 2024). In the absence of a legislative framework of this nature, the importance of increasing both specialized treatment services and preventive actions in community settings cannot be overstated, whether in the form of information campaigns or group or individual interventions. Political will is therefore needed to allocate resources to public agencies and non-governmental organizations to develop treatment and preventive interventions that also rely on empirical evidence.

With specific regard to prevention, the school context is where the greatest amount of research has been conducted on how to intervene effectively (Grande-Gosende et al., 2020). To the best of our knowledge, there are at least three evidence-based programs in Spain focussed on reducing gambling problems or modifying some of the cognitive and affective variables that influence the initiation of this activity. It is no coincidence that *Ludens* (Chóliz et al., 2021), *¿Qué te juegas?* (Lloret-Irles & Cabrera-Perona, 2019) and the *La Contrapartida* school intervention of Madrid Salud (Navas et al., 2023) include content to show participants just how gambling advertising influences gambling, for example, by contributing to an overestimation of the real chances of winning. Understanding how difficult it is to profit from gambling and making users aware of the influence strategies used to persuade them to gamble can be key to preventing the onset of gambling use and potential escalation in severity.

References

Browne, M., Langham, E., Rawat, V., Greer, N., Li, E., Rose, J.,... Best, T. (2016). *Assessing gambling-related harm in Victoria: A public health perspective.* Victorian Responsible Gambling Foundation.

Chambers, R. A., Taylor, J. R. & Potenza, M. N. (2003). Developmental neurocircuitry of motivation in adolescence: A critical period of addiction vulnerability. *American Journal of Psychiatry, 160*(6), 1041-1052. https://doi.org/ 10.1176/appi.ajp.160.6.1041

Chóliz, M., Marcos, M. & Bueno, F. (2021). Ludens: A Gambling Addiction Prevention Program Based on the Principles of Ethical Gambling. *Journal of Gambling Studies*, *38*, 993-1008. https://doi.org/ 10.1007/s10899-021-10066-7

Cooper, A., Scherer, C. R., Boies, S. C. & Gordon, B. L. (1999). Sexuality on the Internet: From sexual exploration to pathological expression. *Professional Psychology: Research and Practice, 30*(2), 154. https://doi.org/10.1037/0735-7028.30.2.154

Davies, R. (2022). *Jackpot: How gambling conquered Britain*. Faber & Faber.

Deans, E. G., Thomas, S. L., Derevensky, J. & Daube, M. (2017). The influence of marketing on the sports betting attitudes and consumption behaviours of young men: Implications for harm reduction and prevention strategies. *Harm Reduction Journal, 14*(1), 5. https://doi.org/10.1186/s12954-017-0131-8

Dirección General de Ordenación del Juego. (2023). *Encuesta de Prevalencia de juego 2022-23*. Ministerio de Consumo.

Flayelle, M., Brevers, D., King, D. L., Maurage, P., Perales, J. C. & Billieux, J. (2023). A taxonomy of technology design features that promote potentially addictive online behaviours. *Nature Reviews Psychology, 2*(3), 136-150. https://doi.org/10.1038/s44159-023-00153-4

Goudriaan, A. E. (2020). Integrating neurocognition from bench to bedside in gambling disorder: From neurocognitive to translational studies. *Current Opinion in Behavioral Sciences, 31*, 83-88. https://doi.org/10.1016/j.cobeha.2019.12.012

Grande-Gosende, A., Lopez-Nunez, C., Garcia-Fernandez, G., Derevensky, J. & Fernandez-Hermida, J. R. (2020). Systematic review of preventive programs for reducing problem gambling behaviors among young adults. *Journal of Gambling Studies, 36(*1), 1-22. https://doi.org/ 10.1007/s10899-019-09866-9

Hing, N., Smith, M., Rockloff, M., Thorne, H., Russell, A. M., Dowling, N. A. & Breen, H. (2022). How structural changes in online gambling are shaping the contemporary experiences and behaviours of online gamblers: An interview study. *BMC Public Health, 22*(1), 1620. https://doi.org/10.1186/s12889-022-14019-6

Kesaite, V., Wardle, H. & Rossow, I. (2024). Gambling consumption and harm: A systematic review of the evidence. *Addiction Research & Theory, 32*(3), 194-203. https://doi.org/10.1080/16066359.2023.2238608

Lloret-Irles, D. & Cabrera-Perona, V. (2019). Prevención del juego de apuestas en adolescentes ensayo piloto de la eficacia de un programa escolar. *Revista de Psicología Clínica con Niños y Adolescentes*, *6*(2), 55-61. https://doi.org/ 10.21134/rpcna.2019.06.2.1

Lopez-Gonzalez, H., Griffiths, M. D. & Estévez, A. (2020). In-play betting, sport broadcasts, and gambling severity: A survey study of Spanish sports bettors on the risks of betting on sport while watching

it. *Communication & Sport, 8*(1), 50-71. https://doi.org/10.1177/2167479518816338

Luquiens, A., Guillou, M., Giustiniani, J., Barrault, S., Caillon, J., Delmas, H.,... Grall-Bronnec, M. (2022). Pictograms to aid laypeople in identifying the addictiveness of gambling products (PictoGRRed study). *Scientific Reports, 12*(1), 22510. https://doi.org/10.1038/s41598-022-26963-9

McGrane, E., Wardle, H., Clowes, M., Blank, L., Pryce, R., Field, M., Sharpe, C. & Goyder, E. (2023). What is the evidence that advertising policies could have an impact on gambling-related harms? A systematic umbrella review of the literature. *Public Health, 215*, 124-130. https://doi.org/ 10.1016/j.puhe.2022.11.019

Miller, H. E., Thomas, S. L., Smith, K. M. & Robinson, P. (2016) Surveillance, responsibility and control: an analysis of government and industry discourses about "problem" and "responsible" gambling. *Addiction Research & Theory, 24*, 163-176. https://doi.org/ https://doi.org/10.3109/16066359.2015.1094060

Navas, J. F., Billieux, J., Verdejo-García, A. & Perales, J. C. (2019). A neurocognitive approach to core components of gambling disorder: Implications for assessment, treatment and policy. In H. Bowden-Jones, C. Dickson, C. Dunand, y O. Simon (Eds.), *Harm Reduction for Problem Gambling: A Public Health Approach*. Routledge. http://hdl.handle.net/10481/53073

Navas, J. F., Martín-Perez, C., Vadillo, M. & Perales, J. C. (2023). *Prevención del trastorno por juego de azar con jóvenes y adolescentes en entorno escolar: El programa de "La Contrapartida"*. Servicio de Prevención de Adicciones de Madrid Salud.

Parke, J., Parke, A. & Blaszczynski, A. (2016). *Key issues in product-based harm minimization: Examining theory, evidence and policy issues relevant in Great Britain.* The responsible Gambling Trust. https://doi.org/ 10.13140/RG.2.2.30894.10560

Pitt, H., Thomas, S. L., Bestman, A., Daube, M. & Derevensky, J. (2017). Factors that influence children's gambling attitudes and consumption intentions: Lessons for gambling harm prevention research, policies and advocacy strategies. *Harm Reduction Journal, 14*(1), 1-12. https://doi.org/10.1186/s12954-017-0136-3

Plan Nacional sobre Drogas. (2024). *Informe sobre adicciones comportamentales y otros trastornos adictivos, 2024*. Observatorio Español de las Drogas y las Adicciones y Delegación del Gobierno para el Plan Nacional sobre Drogas. Ministerio de Sanidad.

Sharman, S., Butler, K. & Roberts, A. (2019). Psychosocial risk factors in disordered gambling: A descriptive systematic overview of vulnerable populations. *Addictive Behaviors*, 99, 106071. https://doi.org/ 10.1016/j.addbeh.2019.106071

Torrance, J., John, B., Greville, J., O'Hanrahan, M., Davies, N. & Roderique-Davies, G. (2021). Emergent gambling advertising: A rapid review of marketing content, delivery and structural features. *BMC Public Health, 21,* 718. https://doi.org/10.1186/s12889-021-10805-w

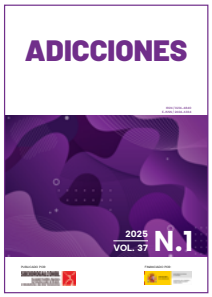
Torrance, J., Roderique-Davies, G., Thomas, S. L., Davies, N. & John, B. (2021). 'It's basically everywhere': Young adults' perceptions of gambling advertising in the UK. *Health Promotion International, 36*(4), 976-988. https://doi.org/10.1093/heapro/daaa126

Torrance, J., O'Hanrahan, M., Carroll, J. & Newall, P. (2023). The structural characteristics of online sports betting: A scoping review of current product features and utility patents as indicators of potential future developments. *Addiction Research & Theory*, *32*(3), 204–218. https://doi.org/10.1080/16066359.2023.2241350

Yücel, M., Carter, A., Harrigan, K., van Holst, R. J. & Livingstone, C. (2018). Hooked on gambling: A problem of human or machine design? *The Lancet Psychiatry, 5*(1), 20-21. https://doi.org/10.1016/S2215-0366(17)30467-4

SOCIDROGALCOHOL
Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías

ADICCIONES
2025 ■ VOL. 37 ■ N. 1 ■ PAGES 7–18
www.adicciones.es



ORIGINAL

Dismantling stereotypes: Sexual orientation and risk for substance use in adolescence

Desmontando estereotipos: Orientación sexual y riesgo para el consumo de sustancias en la adolescencia

Alicia Pérez-Albéniz*,**; Beatriz Lucas-Molina**,***; Adriana Díez-Gómez*,**; Julia Pérez-Sáenz*,**; Eduardo Fonseca-Pedrero*,**.

* Universidad de La Rioja, Spain.
** Programa Riojano de Investigación en Salud Mental (PRISMA), Spain.
*** Universitat de València, Spain.

Abstract

Substance use and abuse is a major public health problem. Research has generally shown that sexual minority groups such as lesbian, gay, bisexual, transgender and other (LGBT+) people are among the most at-risk vulnerable groups for substance use. However, research in the Spanish context is very scarce and has not analyzed these issues. This research, therefore, aimed to analyze substance use in young people according to their sexual orientation through two studies using representative samples of adolescents. The analyses revealed only some differences in substance use by sexual minority groups. Bisexual adolescents showed a higher frequency of use in some indicators of tobacco, cannabis and alcohol, and lesbians showed a higher frequency of heavy alcohol use but no other indicators of differential use. Questioning adolescents, on the other hand, had the lowest rates of use compared to the other groups on many indicators. Results derived from both studies could indicate, at least with these samples and indicators, that there is no generalized and more frequent use of substances by people of sexual minority groups, which could suggest the existence of a stereotype rather than a fact.

Keywords: sexual minorities, substance use, adolescence, drugs

Resumen

El uso y abuso de sustancias es un importante problema de salud pública. La investigación generalmente ha mostrado que los grupos de personas de minorías sexuales como lesbianas, gais, bisexuales, transexuales y otros (LGBT+) se ubican entre los grupos vulnerables de mayor riesgo de consumo. Sin embargo, la investigación en el contexto español es muy escasa y no ha analizado esta cuestión. Esta investigación, por lo tanto, pretendió analizar el consumo de sustancias en jóvenes según su orientación sexual a través de dos estudios utilizando muestras representativas de adolescentes. Los análisis revelaron únicamente algunas diferencias en el consumo de sustancias por parte de los grupos de minorías sexuales. Los y las adolescentes bisexuales presentaron una frecuencia mayor de consumo en algunos indicadores de tabaco, cannabis y alcohol y las lesbianas mostraron una mayor frecuencia de consumo intensivo de alcohol, pero no otros indicadores de consumo diferencial. Por su parte, los adolescentes *questioning* presentaron las tasas de consumo más bajas en comparación con los otros grupos en muchos indicadores. Los resultados de ambos estudios podrían indicar, al menos con estas muestras y con estos indicadores, que no existe un uso generalizado y más frecuente de sustancias por parte de personas de minorías sexuales, lo que podría sugerir la existencia de un estereotipo y no tanto responder a un hecho.

Palabras clave: minorías sexuales, uso de sustancias, adolescencia, drogas

■ *Received: June 2023; Accepted: August 2023.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Beatriz Lucas Molina. Departamento Psicología Evolutiva y de la Educación. Avda. Blasco Ibáñez, 13, 46010, Valencia. Tfno.: 963 983 928.
Email: beatriz.lucas@uv.es

In comparison to the general population, members of sexual minority groups, i.e., people belonging to minorities according to their sexual orientation and gender identity (LGBT+), often face additional challenges which can contribute to the emergence of mental health issues. It is not the fact of belonging to such groups that explains the differences in mental health, but rather having to face situations of social stigma, discrimination, rejection by family and community, violence, harassment and lack of acceptance and support, all of which can generate chronic stress and increase the vulnerability of LGBT+ people to presenting mental health problems (Meyer, 2003; Meyer et al., 2021).

Indeed, research has shown an association between belonging to sexual minorities and a greater risk of experiencing mental health problems, including depression, anxiety, post-traumatic stress disorder, suicidal behaviour or substance use disorders (e.g., Pitman et al., 2022; Saha et al., 2023; Spittlehouse et al., 2020).

In relation to substance use, studies have shown greater consumption in the sexual minority population (Goldbach et al., 2014; Marshal et al., 2008; Wallace & Santacruz, 2017). Specifically, greater alcohol use, earlier onset of use (Fish et al., 2017; Talley et al., 2014), greater use of tobacco and cannabis (Corliss et al., 2010; London-Nadeau et al., 2021; Watson et al., 2018), and abuse of prescription opioids and tranquilizers (Kecojevic et al., 2012) by sexual minority youth have all been documented.

However, research has not always taken into account the considerable heterogeneity within these groups. Previous studies have not systematically analysed possible differences between sexual orientation groups, for example, potential differences between bisexual or gay and lesbian groups, or differences based on gender. When these issues have indeed been analysed, the bisexual group and young women have shown a higher risk of substance use (Plöderl & Tremblay, 2015; Talley et al., 2014; Watson et al., 2020). Furthermore, the number of studies considering questioning individuals has been limited (e.g., Birkett et al., 2009).

International scientific research on LGB health is also limited and very little has been conducted with youth outside the United States or Canada, raising doubts about the generalizability of results. Specifically, to the best of our knowledge, no studies have been carried out in Spain with representative samples of adolescents. In fact, in its assessment of drug use in secondary education in Spain, the ESTUDES survey (Plan Nacional sobre Drogas, 2022) fails to ask whether or not respondents belong to sexual minorities and, therefore, does not provide results on sexual diversity and gender as a potential risk factor for Spanish adolescents.

Given this research context, two studies were carried out with the main objective of analysing substance use in young people by their sexual orientation.

Study 1

In Study 1, the aim was to analyse possible differences in the age of onset of use of various substances by sexual orientation and gender. Likewise, the lifetime prevalence of tobacco, alcohol, tranquilizer and cannabis use was studied based on sexual orientation and the current frequency of use of the different substances in the previous month and previous year according to sexual orientation and gender.

Method

Sample

The sample was selected using stratified random cluster sampling of the population of students aged between 14 and 18 years (approximately 15,000 students) in La Rioja. A total of 1,972 young people in 98 classrooms belonging to 30 schools participated in data collection. The sample comprised students in secondary education and vocational training in state schools (45.2%) and charter schools (54.8%), and from different socioeconomic levels. The variables used for stratification were geographical area and educational level. Participants with more than two points (n = 146) on the Oviedo Infrequency Scale–Revised (Fonseca-Pedrero et al., 2019) or aged over 18 years (n = 36) were removed from the sample, which finally comprised 1,790 students. Of the total, 816 were boys (45.6%), 961 were girls (53.7%) and 13 were intersex and transsexual (0.7%). The mean age was 15.70 years (SD = 1.26). The distribution by sexual orientation (attraction) was: heterosexual (n = 1,518), gay/lesbian (n = 18), bisexual (n = 197), and questioning or uncertain (n = 44).

Given the very large size of the heterosexual group, it was necessary to establish an equivalent comparison group, so a group (n = 150) was randomly drawn, leading to a final selection of 309 participants in total.

Instruments

Sexual orientation scale

The Kinsey Scale (Kinsey et al., 1948) was used to examine sexual orientation. This scale covers different categories of sexual orientation, designating a sexual continuum ranging from exclusive attraction to people of the opposite sex to exclusive attraction to people of the same sex, with intermediate degrees of non-exclusivity, used to define the group of bisexual participants. Similarly, the scale has an "I am not sure" category that was used for the group of questioning individuals.

Oviedo Infrequency Scale-Revised (INF-OV-R) (Fonseca-Pedrero et al., 2019)

The scale was administered to participants to detect those who responded randomly, pseudo-randomly, or dishonestly. The INF-OV-R instrument is a self-report composed of 10

items with a dichotomous response format (*yes/no*). Students with two or more incorrect answers on the INF-OV-R scale were eliminated from the sample.

Substance use indicators

Questions from the ESTUDES survey (Plan Nacional sobre Drogas, 2019, 2022) were used. This analysed drug use among young people in Spain. The questions selected for inclusion in the study were: a) age of onset of tobacco, alcohol, tranquilizers and cannabis use, b) frequency of use in the last month, c) frequency of alcohol and cannabis use in the last year, as well as the frequency with which they have got drunk or participated in a *botellón* (heavy drinking in a public space) in the last year.

Procedure

The research was carried out in the winter of 2019 and is part of a broader project on emotional well-being in adolescence. It was approved by the General Directorate of Education of the Government of La Rioja and the Ethical Committee for Clinical Research of La Rioja (CEICLAR). Schools were randomly selected, and their school principals were visited to explain the research project. The process of administering the instruments was standardized through a protocol for all researchers. The questionnaires were administered by computer and collectively in a 50-minute session during school hours in a classroom specifically prepared for this purpose. Informed consent was requested from families or legal guardians for participants aged under 18, and confidentiality and the voluntary nature of the study were guaranteed. Students did not receive any incentive for their participation in the study.

Data analysis

Firstly, descriptive statistics were calculated to analyse possible differences in the age of onset of the use of different substances. The effects of sexual orientation and gender on the age of onset were studied using various analyses of variance (ANOVAs) since the high frequency of missing values (indicative of non-consumption) did not allow for a multivariate analysis of variance (MANOVA) nor a recoding without affecting the results. The partial eta squared statistic was used as an index of effect size (*partial* η^2: small = .01; medium = .06; large = .14).

Secondly, to obtain the lifetime prevalence of these substances, the age of onset variable was recoded. Participants who had stated that they had used a substance were coded as positive for that substance, and those who had stated that they had never smoked, for example, were coded as negative. In this way, analyses could be carried out on the possible differences in lifetime use depending on the sexual orientation of the participants using the chi-square statistic. As a measure of effect size, Cramer's *V* was used, which ranges from 0 to 1 to indicate association strength.

Thirdly, for analyses of the frequency with which participants used different substances, descriptive statistics were calculated based on the sexual orientation and gender subgroups. A MANOVA was also carried out with sexual orientation and gender as independent factors and frequencies of use as dependent variables. Wilks' lambda value (Wilks' λ) was used to check for significant main effects and interactions between the sexual orientation and gender variables. The partial eta squared statistic was used as an index of effect size. ANOVAs were then performed to analyse the individual effects on the different substances.

All analyses were carried out with the IBM SPSS statistical package (version 28).

Results

Age of onset of substance use

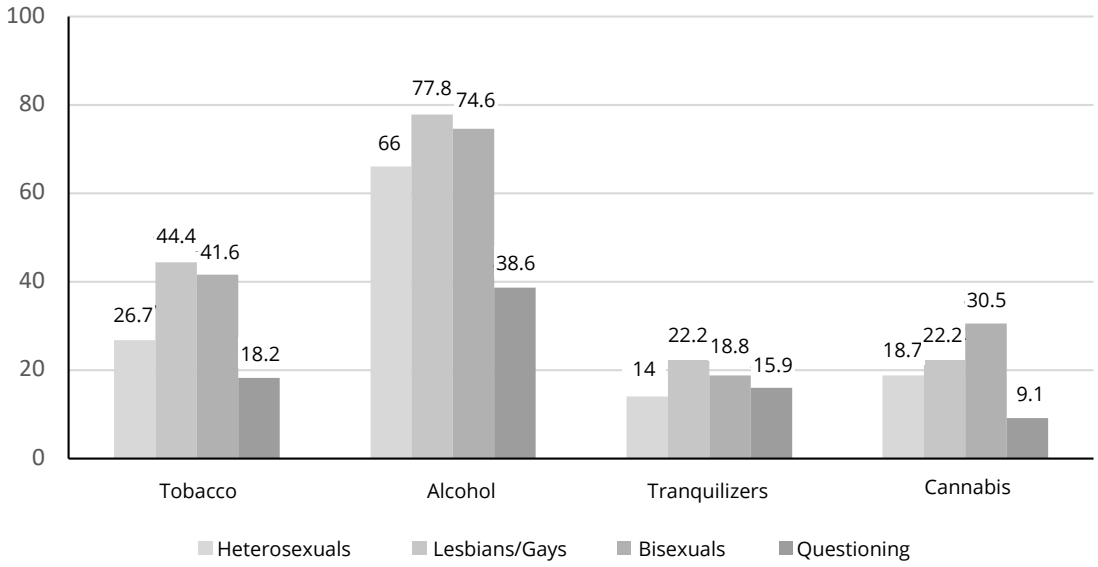
Table 1 presents the descriptive statistics (means and standard deviations) for all study variables by sexual orientation and gender. The average ages of onset for

Table 1
Means (standard deviation) for age of initiation of substance use according to sexual orientation and gender

	HE			LG			BI			Q		
	T	F	M	T	F	M	T	F	M	T	F	M
Tobacco	14.22 (1.54)	14.03 (1.56)	14.57 (1.50)	14.25 (.88)	14.50 (.57)	14.00 (1.15)	13.76 (1.67)	13.73 (1.67)	14.14 (1.86)	14.12 (1.24)	14.42 (.97)	12.00 -
Alcohol	13.95 (1.24)	13.93 (1.17)	14.00 (1.35)	14.14 (1.02)	14.42 (1.13)	13.85 (.89)	13.93 (1.26)	13.94 (1.25)	13.90 (1.37)	14.11 (1.49)	14.25 (.75)	13.80 (2.68)
Tranquilizers	14.09 (1.84)	14.28 (1.68)	13.71 (2.21)	15.75 (.95)	15.75 (.95)	- -	14.05 (1.89)	13.97 (1.91)	15.00 (1.73)	13.60 (1.14)	13.66 (1.52)	13.50 (.70)
Cannabis	14.60 (1.79)	14.62 (1.66)	14.58 (2.02)	14.25 (.95)	15.00 (.00)	13.50 (.70)	14.91 (1.41)	14.90 (1.30)	15.00 (2.23)	13.75 (2.06)	14.33 (2.08)	12.00 -

Note. T = total; F = female; M = male. HE= heterosexuals; LG = lesbians/Gays; BI = bisexuals; Q = questioning. The number of participants is not shown in the table since it varies for each substance.

Figure 1
Lifetime prevalence (%) in the use of tobacco, alcohol, tranquilizers and cannabis according to participants' sexual orientation



different substances (tobacco, alcohol, tranquilizers and cannabis) were around 14 years.

The ANOVA results indicated that the age of onset did not differ according to the sexual orientation of the participants for tobacco [F (3, 130) = .67, p > .05; *partial* η^2 = .015], nor for alcohol [F (3, 269) = .13, p > .05; *partial* η^2 = .001], nor tranquilizers [F (3, 60) = 1.23, p > .05; *partial* η^2 = .058] nor cannabis [F (3, 88) = 1.30, p > .05; *partial* η^2 = .043]. Nor was a significant main effect of gender or a significant interaction between sexual orientation and gender observed (p > .05).

Lifetime prevalence of substance use

Secondly, possible differences in lifetime prevalence were analysed (see Figure 1) for the use of tobacco, alcohol, tranquilizers and cannabis. The results indicated statistically significant differences in lifetime consumption by participants' sexual orientation for tobacco [χ^2 (3, 409) = 14.52, p < .01; V = *.18*], alcohol [χ^2 (3, 409) = 22.35, p < .01; V = *.23*], and cannabis [χ^2 (3, 407) = 12.36, p < .01; V = *.17*], but not tranquilizers [χ^2 (3, 409) = 1.79, p > .05; V = *.06*], although the effect sizes were very small.

For tobacco use, post-hoc Bonferroni contrasts indicated that a greater proportion of participants in the bisexual orientation group had smoked compared to the other groups, except for the group comprising lesbians and gays, who in turn presented similar tobacco use to heterosexuals and questioning individuals. For alcohol use, participants in the questioning group drank the least and thus differed significantly from the other groups. Finally, for cannabis, the bisexual group presented higher lifetime prevalence than questioning participants and heterosexuals, although they did not differ from the group made up of lesbians and gays, which in turn presented levels of use similar to the heterosexual and questioning groups.

Frequency of substance use in the previous month and previous year

Descriptive statistics (means and standard deviations) of the frequency of use indicators in the last month and in the last year were calculated according to sexual orientation and gender (see Table 2).

Additionally, to check for the possible existence of statistically significant differences, a MANOVA was performed with the frequencies of use as dependent variables and participants' sexual orientation and gender as fixed factors.

The MANOVA did not reveal significant main effects for the sexual orientation variable [*Wilk´s* λ= .92, $F_{(27, 1139)}$ = 1.13; p > .05; *partial* η^2 = .026], nor for gender [*Wilk´s* λ= 0.97, $F_{(9, 390)}$ = 1.03; p > .05; *partial* η^2 = .023] nor for the interaction between the two [*Wilk´s* λ= 0.91, $F_{(27, 1139)}$ = 1.23; p > .05; *partial* η^2 = .028].

While the MANOVA was not significant, the individual ANOVAs showed main effects on the basis of sexual orientation for the frequency of alcohol use in the previous month and the previous year [F (3, 398) = 3.16, p < .05; *partial* η^2 = .023 and F(3, 398) = 4.72, p < .05; *partial* η^2 = .034, respectively], and a significant interaction effect between sexual orientation and gender for the frequency of

Table 2
Means (standard deviation) for frequency of use (previous month and previous year) according to sexual orientation and gender

	HE			LG			BI			Q		
	T *n*=150	F *n*=88	M *n*=62	T *n*=18	F *n*=8	M *n*=10	T *n*=196	F *n*=161	M *n*=35	T *n*=42	F *n*=32	M *n*=10
Frequency previous month												
Tobacco	.40 (.92)	.48 (.99)	.29 (.81)	.44 (1.04)	.63 (1.18)	.30 (.94)	.69 (1.13)	.80 (1.18)	.20 (.63)	.21 (.64)	.22 (.65)	.20 (.63)
Alcohol	1.35 (1.63)	1.23 (1.52)	1.53 (1.79)	2.11 (2.05)	2.88 (1.95)	1.50 (2.01)	1.59 (1.85)	1.68 (1.89)	1.17 (1.58)	.52 (1.13)	.41 (1.07)	.90 (1.28)
Drunkeness	.54 (1.19)	.47 (.89)	.65 (1.52)	.94 (1.47)	1.88 (1.80)	.20 (.42)	.65 (1.21)	.69 (1.22)	.49 (1.19)	.45 (1.08)	.41 (1.13)	.60 (.96)
Cannabis	.44 (1.41)	.33 (1.15)	.60 (1.72)	.06 (.23)	.13 (.35)	.00 (.00)	.61 (1.75)	.69 (1.82)	.26 (1.35)	.12 (.39)	.13 (.42)	.10 (.31)
Frequency previous year												
Alcohol	3.78 (2.95)	3.74 (2.78)	3.84 (3.21)	5.22 (2.92)	5.75 (2.86)	4.80 (3.04)	4.27 (2.89)	4.41 (2.83	3.60 (3.07)	1.93 (2.68)	1.66 (2.37)	2.80 (3.49)
Drunkeness	1.53 (2.29)	1.65 (2.21)	1.37 (2.41)	2.89 (2.90)	4.38 (3.20)	1.70 (2.11)	2.20 (2.61)	2.43 (2.62)	1.14 (2.29	1.00 (2.01)	.72 (1.61)	1.90 (2.85)
Botellón	1.01 (1.33)	1.06 (1.28)	.94 (1.42)	1.44 (1.24)	2.13 (1.24)	.90 (.99)	1.15 (1.39)	1.24 (1.39)	.71 (1.29)	.48 (.94)	.38 (.83)	.80 (1.22)
Cannabis	.96 (2.25)	.85 (1.99)	1.11 (2.60)	.89 (1.81)	1.13 (2.10)	.70 (1.63	1.37 (2.46	1.53 (2.57)	.63 (1.75)	.38 (1.37)	.34 (1.33)	.50 (1.58)

Note: T = total; F = female; M = male. HE= heterosexual; LG = lesbians/Gays; BI = bisexuals; Q = questioning.

drunkenness in both the previous month and the previous year [$F(3, 398) = 3.42$, $p < .5$; *partial* $\eta^2 = .025$ and $F(3, 398) = 3.45$, $p < .05$; *partial* $\eta^2 = .025$, respectively].

Post-hoc Bonferroni analyses revealed the existence of statistically significant differences by sexual orientation for alcohol use both in the last 30 days and for the last year. Questioning participants reported drinking alcohol with a significantly lower frequency than the other groups. Contrary to expectations, the results did not yield differences based on belonging to sexual minorities.

Post-hoc Bonferroni analyses also showed that there was an interaction between sexual orientation and gender for the frequency of drunkenness both in the last month and in the last year. Lesbian women showed a significantly higher frequency of alcohol use to the point of drunkenness than the other groups.

Study 2

The aim in Study 2 was to confirm the results of Study 1, with an increased sample and the introduction of non-prescription tranquilizers to the analysis. To this end, possible differences in the lifetime prevalence of tobacco, alcohol, cannabis and tranquilizer use and the frequency of use of these different substances in the last year were analysed by sexual orientation and gender.

Method

Sample

Within the PSICE La Rioja Study (Fonseca-Pedrero et al., 2023), the sample was selected using stratified random sampling by population clusters of students aged between 12 and 18 years (approximately 15,000 students) in La Rioja. A total of 2,640 young people from 32 schools and a total of 163 classrooms participated in the study. The sample came from state (45%), and charter schools (55%) in secondary education and vocational training, as well as from different socioeconomic levels. The variables used to stratify were geographical area and educational level.

Those participants with more than two points (n = 175) on the Oviedo Infrequency Scale-Revised (Fonseca-Pedrero et al., 2019), or aged over 18 years (n = 247) were excluded from the sample, which finally comprised 2,235 students.

Of the total, 1,045 were boys (46.8%), 1,183 were girls (52.9%) and 7 were intersex (0.3%). Mean age was 14.49 years (SD = 1.76), and the distribution by sexual orientation/attraction was: heterosexual (n = 1,749; 78.3%), lesbian/gay (n = 37; 1.7%), bisexual (n = 326; 14.6%), questioning or uncertain (n = 66; 3%) and others (n = 57; 2.6%).

As in Study 1, given the fact that the heterosexual group was very large and the need to establish an equivalent

comparison group, a sample was randomly drawn (n = 323), so that the final sample had 752 participants.

Instruments

Sexual orientation scale (see Study 1).

Oviedo Infrequency Scale-Revised (see Study 1).

Substance use indicators

Two indicators were used: a) lifetime prevalence of tobacco, alcohol, cannabis and non-prescription tranquilizer use, and b) frequency of use in the previous year of the same substances. As in Study 1, the indicators were extracted from the ESTUDES survey (Plan Nacional sobre Drogas, 2019, 2022).

Procedure

The research was carried out in the winter of 2022 and is part of the PSICE study in La Rioja. It was approved by the Ministry of Education of La Rioja, by the Clinical Research Ethics Committee of La Rioja (CEImLAR), and by the Research Ethics Committee of the University of La Rioja. The procedure was similar to that carried out in Study 1 in terms of the method for administering questionnaires, use of consents and the assurance of confidentiality and voluntariness.

Data analysis

Firstly, the chi-square statistic was used to analyse the lifetime prevalence of different substances according to participants' sexual orientation.

Secondly, for the analyses of the frequency with which participants used the different substances, descriptive statistics were calculated by sexual orientation and gender subgroups. A MANOVA was also performed with sexual orientation and gender as independent factors and frequencies of use as dependent variables. Wilks' lambda was used (Wilks' λ) to observe possible significant main effects and interactions between the sexual orientation and gender variables. The partial eta squared statistic was used as an index of effect size. ANOVAs were subsequently conducted to analyse the individual effects on the different substances.

All analyses were performed with the IBM SPSS statistical package (version 28).

Results

Lifetime prevalence of substance use

Possible differences in lifetime prevalence were analysed (see Figure 2) for tobacco, alcohol, tranquilizer and cannabis use. Results indicated statistically significant differences in lifetime use according to participants' sexual orientation for tobacco [χ^2 (3, 754) = 17.50, $p < .01$; $V = .15$], alcohol [χ^2 (3, 754) = 22.22, $p < .01$; $V = .17$], and cannabis [χ^2 (3, 754)

Figure 2

Liefetime prevalence (%) in the use of tobacco, alcohol, tranquilizers and cannabis according to participants' sexual orientation

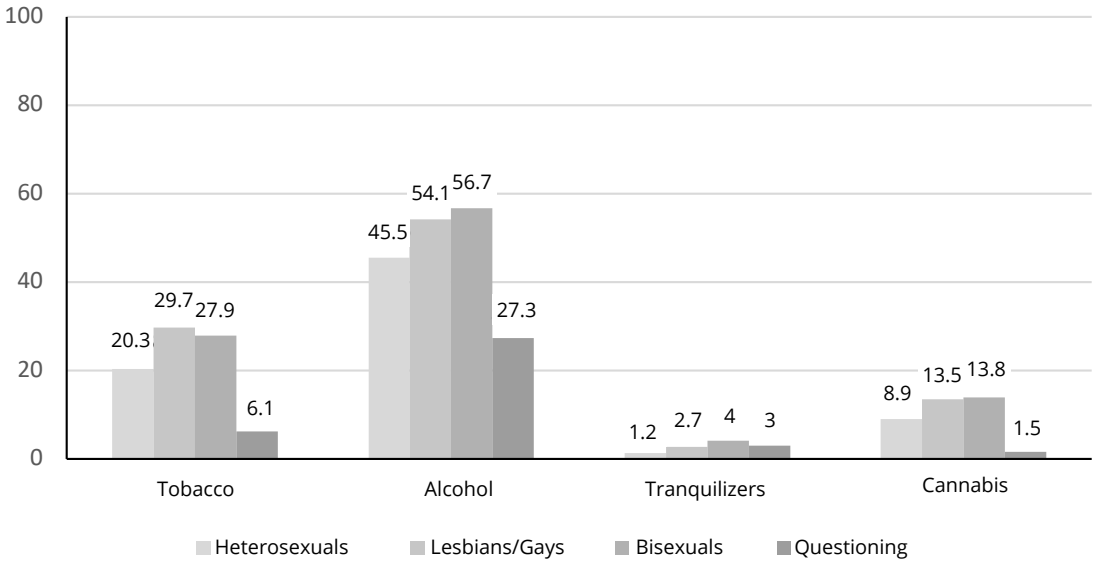


Table 3
Means (standard deviation) for frequency of use in the last year according to sexual orientation and gender

	HE			LG			BI			Q		
	T *n*=323	F *n*=173	M *n*=150	T *n*=37	F *n*=22	M *n*=15	T *n*=326	F *n*=282	M *n*=44	T *n*=66	F *n*=52	M *n*=14
Tobacco	.39 (.94)	.51 (1.14)	.29 (.71)	.65 (1.23)	.77 (1.47)	.47 (.74)	.67 (1.29)	.69 (1.33)	.52 (1.02)	.15 (.70)	.19 (.79)	.00 (.00)
Alcohol	.82 (1.05)	.91 (1.07)	.75 (1.04)	.97 (1.09)	1.09 (1.19)	.80 (.94)	.97 (1.05)	1.00 (1.07)	.82 (.89)	.45 (0.86)	.52 (.91)	.21 (.57)
Tranquilizers	.03 (.30)	.06 (.43)	.01 (.07)	.05 (.32)	.09 (.42)	.00 (.00)	.07 (.40)	.07 (.41)	.05 (.30)	.03 (.17)	.04 (.19)	.00 (.00)
Cannabis	.12 (.44)	.11 (.45)	.13 (.43)	.19 (.56)	.27 (.70)	.07 (.25)	.22 (.65)	.23 (.67)	.16 (.47)	.05 (.36)	.06 (.41)	.00 (.00)

Note. T = total; F = female; M = male. HE= heterosexual; LG = lesbians/Gays; BI = bisexuals; Q = questioning.

= 10.56, $p < .01$; $V = .11$], but not for tranquilizers [χ^2 (3, 754) = 4.83, $p > .05$; $V = .08$].

For smoking, post-hoc Bonferroni contrasts indicated that participants in the questioning group used proportionally less tobacco than the other groups. For drinking, participants in the bisexual group drank significantly more alcohol than the heterosexual group, which in turn drank significantly more than questioning participants. Finally, for use of cannabis, the questioning group differed significantly from the other groups, presenting the lowest level of consumption of all the groups. It is important to note that effect sizes were very low.

Frequency of substance use in the last year

Descriptive statistics (means and standard deviations) for the frequency of use indicators in the previous year were calculated by sexual orientation and gender (see Table 3).

Additionally, to determine the possible existence of statistically significant differences, a MANOVA was performed with the frequencies of use as dependent variables and the sexual orientation and gender of the participants as fixed factors.

The MANOVA did not yield significant main effects for the sexual orientation variable [*Wilks'* λ= .98, $F_{(12, 1960)}$ = 1.19; $p > .05$; *partial* $\eta^2 = .006$], nor for gender [*Wilks'* λ= 0.99, $F_{(4, 741)} = 1.14$; $p > .05$; *partial* $\eta^2 = .006$] nor for the interaction between both [*Wilks'* λ= 0.99, $F_{(12, 1960)} = .30$; $p > .05$; *partial* $\eta^2 = .002$].

Although the MANOVA was not significant, it was noted that the individual ANOVAs indicated main effects by sexual orientation for the frequency of tobacco and alcohol use. Post-hoc Bonferroni analyses revealed the existence of statistically significant differences by sexual orientation for smoking, with higher use in the bisexual group compared to heterosexuals and questioning participants. Regarding alcohol use in the previous year, results indicated greater use by bisexuals than the group of questioning participants, but the differences were not significant compared to the heterosexual group.

Discussion

The use and abuse of substances, especially during adolescence, represents an important public health problem (United Nations Office on Drugs and Crime, 2022; Plan Nacional sobre Drogas, 2022), with a relevant impact on the psychological well-being of the young. Belonging to sexual minorities has been shown in the literature to constitute a potential risk factor for substance use, raising the likelihood not only of their use but also abuse during adolescence (Mereish, 2019; Watson et al., 2018).

The common objective of the present studies was to analyse substance use according to sexual orientation in two representative samples of adolescents. We expected to find disparities between sexual minority groups compared to a heterosexual group, in line with previous research. However, results yielded only some differences, with very limited effect sizes and only for some of the indicators analysed.

Regarding the results of Study 1, no statistically significant differences were found in the age of onset of use. In terms of lifetime prevalence of use, differences were observed in the use of tobacco and cannabis between the group of bisexual participants and the other groups. The remaining differences found were related to lower use by the questioning group, but not to higher use by the LGB subgroups compared to their heterosexual peers. With regard to the frequency of use, only a certain tendency towards greater alcohol use by lesbians was observed, but the differences were not always statistically significant in all indicators.

Moreover, these results were not confirmed in Study 2, where a higher lifetime prevalence was found only in alcohol use, but not in tobacco or cannabis, as had been observed in Study 1. Likewise, a trend towards greater

frequency of tobacco use in the previous 12 months was observed in participants of the bisexual group compared to the heterosexual group. Again, the other differences between groups were linked to lower consumption in the questioning group, but not to differences between the LGB and heterosexual subgroups.

These results are in contrast with previous studies reporting a generalized increased risk of substance use among sexual minority youth (Goldbach et al., 2014; Marshal et al., 2008; Padilla et al., 2010; Pesola et al., 2014; Wallace & Santacruz, 2017) and indicate that this relationship may be complex and influenced by various individual, social and cultural factors. The hypothesis on which this research was based is that one of the factors potentially contributing to a greater risk of substance use in sexual minorities includes stress and discrimination. The literature indicates that such chronic stress can increase vulnerability toward substance use as a form of coping (Wojdala et al., 2020). However, the results do not seem to be conclusive when attempting to corroborate this hypothesis.

Despite the systematic observation in both Spanish (e.g., Espada et al., 2012; Pérez de Albéniz et al., 2023) and international studies (e.g., Raifman et al., 2020; Spittlehouse et al., 2020; Williams et al., 2021) that sexual minorities have a greater vulnerability to presenting difficulties related to mental health, the use of substances such as tobacco, alcohol, cannabis or tranquilizers did not seem to be a generalized strategy for regulating such distress among adolescents in our context.

That said, as already indicated in other studies, the results found would reveal the need to consider the diversity existing among sexual minority groups (Fish et al., 2019), as well as to take other contextual variables into account (Watson et al., 2020). The differences are not generalizable to all subgroups or all substances: the data indicate that sexual minority groups may not differ from the heterosexual group to the same extent in substance use.

Firstly, a trend (although not stable and general) was observed in the group of bisexual participants towards greater use of tobacco, alcohol and cannabis in some indicators. This trend is consistent with previous research indicating greater use by this group of different substances (Ford & Jasinski, 2006; Russell et al., 2002), especially among women (Corliss et al., 2010; Ford & Jasinski, 2006), as well as worse mental health indicators (e.g., Hatzenbuehler et al., 2014; Plöderl & Tremblay, 2015; Ross et al., 2018). In any case, the conclusion drawn from these results is not a bleak one: some marginal differences exist, but not in all indicators and with small effect sizes.

Secondly, a result observed in Study 1 is the greater frequency of binge drinking by lesbians. These differences were not confirmed either in the other indicators of alcohol use or in Study 2, but it is consistent with earlier research indicating greater alcohol use in this subgroup (Boyle et al., 2020; Green & Feinstein, 2012). Although more research is needed in this area, risky or harmful patterns of alcohol or drug use may play multiple roles in the lives of sexual minority women, for example, as coping responses to uncontrollable life stressors or to the dynamics of dysfunctional relationships; such a coping strategy focused on the emotions can make them vulnerable to aggression and become a risk factor for their mental health (Tubman et al., 2023). Indeed, some studies support this hypothesis, showing that experiences of discrimination, victimization and social isolation partially explain the disparity of sexual orientation in mental health and substance use (Bränström & Pachankis, 2018).

Finally, the results indicate that the participants in the questioning group had the lowest general level of use, lower even than their heterosexual peers. This contrasts with the few studies and reports regarding this group, which show their substance use to be more frequent than among heterosexual groups (Birkett et al., 2009; Espelage et al., 2008; National Institute on Drug Abuse, 2022a). These results could indicate that questioning sexuality does not imply a greater risk of use. Indeed, following authors who analyse the development of identity during adolescence (Crocetti et al., 2008), such uncertainty is described as a phase of high exploration, something that should not necessarily imply distress and, in this case, greater substance use. However, earlier research indicates that commitment is a mediator in the relationship between identity styles and well-being/distress variables (Sánchez-Queija et al., 2023). Future studies should thus investigate this issue further in sexual minority groups.

One of the other potential explanations for the divergence of the present results from those found in other studies is that current knowledge in this area may have been built up with studies using convenience samples, which can often constitute contexts of use. Previous studies may have drawn their participants from social settings where LGBT+ people may be exposed, such as bars and nightclubs, and which are often associated with substance use (Hughes, 2003; Meyer & Wilson, 2009). Moreover, it should not be forgotten that many of the studies have focused on comparing groups of heterosexuals to non-heterosexuals (combining gay/lesbian/bisexual and even questioning individuals), without considering the heterogeneity within the non-heterosexual group (e.g., Jorm et al. al., 2002; McDonald, 2018); this could have led to erroneous conclusions assuming that all differences were generalizable to all sexual minority groups.

As mentioned above, while historically it was thought that substance use problems were more prevalent in sexual minority populations, the data indicate the need to correct biased perceptions regarding substance abuse among these groups, as has long been suggested by other

authors (Green & Feinstein, 2012). What can be derived from the present results is that, at least in adolescence and in the context in which the studies were carried out, belonging to a sexual minority does not seem to imply greater vulnerability or, at least, not a disproportionate risk as some other authors have stated (Corliss et al., 2010; Marshal et al., 2008).

The present study has several limitations that must be acknowledged. Firstly, self-reports were used, with their well-known biases. Secondly, as other research has noted (e.g., Gonzales & Henning-Smith, 2017; Jorm et al., 2002), some potentially important risk factors were not analysed, such as feelings of stigma, non-disclosure of sexual orientation to significant others or experiences of discrimination and victimization that may be expected to explain the relationship between sexual orientation and substance use. Thirdly, sample sizes, while large, were reduced by the need to equate the heterosexual groups to the minority groups, thus limiting the statistical power of the analyses. Despite these limitations, the two studies were carried out with two representative samples of adolescents and various substance use indicators, with distinctions between groups of sexual minorities (including a group of questioning adolescents) and gender, which should be of particular value.

In conclusion, the differences found were few and require additional studies, but did not support the existence of greater vulnerability on the part of sexual minority groups (at least not generalizable to all groups, genders and substances). The data, if confirmed in additional studies, suggests a need for interventions that take into account differences between sexual and gender minority groups (Fonseca-Pedrero et al., 2021; González-Roz et al., 2023).

Heterosexual adolescents and those belonging to sexual minorities presented comparable substance use in both studies. This result would, therefore, appear very positive given the well-known close relationship between mental health and substance use in adolescence (National Institute on Drug Abuse, 2022b). There is a bidirectional relationship between the two, so that substance use can affect the mental health of adolescents and mental health problems can increase the risk of substance use (for example, as a form of self-medication to help cope with the mental health problems they are experiencing). It is also necessary to take into account the special vulnerability of the adolescent brain to the effects of substances, given their potential negative impact on cognitive and emotional development, as well as on the functioning of the central nervous system (Lees et al., 2020; López-Caneda et al., 2014).

This nevertheless does not mean that their substance use is unproblematic, given the frequency with which they claim to consume the different substances regardless of the groups they belong to. Substance use in adolescence represents a public health problem of great importance throughout the world, and the data derived from this project do not indicate otherwise. Similar indicators to those found in other studies were observed (Plan Nacional sobre Drogas, 2022; European Monitoring Center for Drugs and Drug Addiction, 2022), which underlines that the development of strategies to intervene in this area must continue.

A confirmation of the differences found in the present study would point to the need to design strategic interventions. In addition to the actions already carried out to prevent substance use in the adolescent population (Al-Halabí et al., 2009; Errasti et al., 2009; González-Roz et al., 2023; Jiménez-Padilla & Alonso-Castillo, 2022; Negreiros de Carvalho et al., 2021), issues related to substance use among sexual minorities would have to be addressed. It would be important to promote inclusive and supportive environments, provide education on responsible use, and ensure access to culturally competent health services that address the specific needs of the LGBT+ community (Watson et al., 2020). Additionally, structural factors such as discrimination and stigma that contribute to stress and may influence patterns of use must be addressed.

Acknowledgements

This study has received funding from a Spanish Ministry of Science and Innovation project, reference number PID2021-127301OB-I00, part of the 2021 call for knowledge generation projects, and from an Institute of Rioja Studies research award (BOR nº147, August 2, 2022).

Conflict of interests

The authors declare no conflicts of interest.

References

Al-Halabí-Díaz, S., Errasti-Pérez, J., Fernández-Hermida, J., Carballo-Crespo, J., Secades-Villa, R. & García-Rodríguez, O. (2009). El colegio y los factores de riesgo familiar en la asistencia a programas de prevención familiar del consumo de drogas. *Adicciones, 21*(1), 39-48. http://dx.doi.org/10.20882/adicciones.250

Birkett, M., Espelage, D. L. & Koenig, B. (2009). LGB and questioning students in schools: The moderating effects of homophobic bullying and school climate on negative outcomes. *Journal of Youth and Adolescence, 38*(7), 989-1000. http://dx.doi.org/10.1007/s10964-008-9389-1

Boyle, S. C., Kettering, V., Young, S. H. & LaBrie, J. W. (2020). Lesbians' use of popular social media sites is associated with perceived drinking norms & interest in receiving personalized normative feedback on alcohol use. *Alcoholism Treatment Quarterly*, *38*(4), 415–429. https://doi.org/10.1080/07347324.2020.1723459

Bränström, R. & Pachankis, J. E. (2018). Sexual orientation disparities in the co-occurrence of substance use and psychological distress: A national population-based study (2008-2015). *Social Psychiatry and Psychiatric Epidemiology, 53*(4), 403–412. https://doi.org/10.1007/s00127-018-1491-4

Corliss, H. L., Rosario, M., Wypij, D., Wylie, S. A., Frazier, A. L. & Austin, S. B. (2010). Sexual orientation and drug use in a longitudinal cohort study of U.S. adolescents. *Addictive Behaviors, 35,* 517–521. https://doi.org/10.1016/j.addbeh.2009.12.019

Crocetti, E., Rubini, M. & Meeus, W. (2008). Capturing the dynamics of identity formation in various ethnic groups: Development and validation of a three-dimensional model. *Journal of Adolescence, 31,* 207-222.

Errasti-Pérez, J. M., Al-Halabí-Díaz, S., Secades-Villa, R., Fernández-Hermida, J. R., Carballo, J. L. & García-Rodríguez, O. (2009). Prevención familiar del consumo de drogas: El programa "Familias que funcionan". *Psicothema*, *21*(1), 45–50.

Espada, J. P., Morales, A., Orgilés, M. & Ballester, R. (2012). Self-concept, social anxiety and depressive symptoms in Spanish adolescents based on their sexual orientation. *Ansiedad y Estrés, 18*(1), 31-41.

Espelage, D. L., Aragon, S. R., Birkett, M. & Koenig, B. W. (2008) Homophobic teasing, psychological outcomes, and sexual orientation among high school students: What influence do parents and schools have? *School Psychology Review, 37(*2), 202-216. https://doi.org/10.1080/02796015.2008.12087894

European Monitoring Centre for Drugs and Drug Addiction. (2022). Informe europeo sobre Drogas. Tendencias y novedades. https://www.emcdda.europa.eu/publications/edr/trends-developments/2022_en

Fish, J. N., Watson, R. J., Gahagan, J., Porta, C. M., Beaulieu-Prévost, D. & Russell, S. T. (2019). Smoking behaviours among heterosexual and sexual minority youth? Findings from 15 years of provincially representative data. *Drug and Alcohol Review*, *38*(1), 101-110. https://doi.org/10.1111/dar.12880

Fish, J. N., Watson, R. J., Porta, C. M., Russell, S. T. & Saewyc, E. M. (2017). Are alcohol-related disparities between sexual minority and heterosexual youth decreasing? *Addiction*, *112*(11), 1931–1941. https://doi.org/10.1111/add.13896

Fonseca-Pedrero, E., Pérez-Albéniz, A., Díez-Gómez, A., Ortuño-Sierra, J. & Lucas-Molina, B. (2019). *Escala Oviedo de Infrecuencia de Respuesta-Revisada* [Oviedo Response Infrequency Scale-Revised, Unpublished manuscript]. Departament of Educational Sciences. University of La Rioja.

Fonseca-Pedrero, E., Pérez-Albéniz, A., Al-Halabí, S., Lucas-Molina, B., Ortuño-Sierra, J., Díez-Gómez, A., Pérez-Sáenz, J., Inchausti, F., Valero García, A. V., Gutiérrez García, A., Aritio Solana, R., Ródenas-Perea, G., De Vicente Clemente, M. P., Ciarreta López, A. & Debbané, M. (2023). PSICE project protocol: Evaluation of the unified protocol for transdiagnostic treatment for adolescents with emotional symptoms in school settings. *Clínica y Salud, 34*(1), 15 - 22. https://doi.org/10.5093/clysa2023a3

Fonseca-Pedrero, E., Pérez-Álvarez, M., Al-Halabí, S., Inchausti, F., López-Navarro, E. R., Muñiz, J., Lucas-Molina, B., Pérez-Albéniz, A., Rivera, R. B., Cano-Vindel, A., Gimeno-Peón, A., Prado-Abril, J., González-Menéndez, A., Valero, A. V., Priede, A., González-Blanch, C., Ruiz-Rodríguez, P., Moriana, J. A., Gómez, L. E.,… Montoya-Castilla, I. (2021). Empirically supported psychological treatments for children and adolescents: State of the art. *Psicothema*, *33*(3), 386-398. https://doi.org/10.7334/psicothema2021.56

Ford, J. A. & Jasinski, J. L. (2006). Sexual orientation and substance use among college students. *Addictive Behaviors, 31*(3), 404–413. https://doi.org/10.1016/j.addbeh.2005.05.019

Goldbach, J. T., Tanner-Smith, E. E., Bagwell, M. & Dunlap, S. (2014). Minority stress and substance use in sexual minority adolescents: A meta-analysis. *Prevention Science, 15*(3), 350-363. https://doi.org/10.1007/s11121-013-0393-7

Gonzales, G. & Henning-Smith, C. (2017). Health disparities by sexual orientation: Results and implications from the Behavioral Risk Factor Surveillance System. *Journal of Community Health, 42*(6), 1163-1172. https://doi.org/10.1007/s10900-017-0366-z

González-Roz, A., Martínez-Loredo, V., Maalouf, W., Fernández-Hermida, J. R. & Al-Halabí, S. (2023). Protocol for a trial assessing the efficacy of a universal school-based prevention program for addictive behaviors. *Psicothema*, *35*(1), 41–49. https://doi.org/10.7334/PSICOTHEMA2022.251

Green, K. E. & Feinstein, B. A. (2012). Substance use in lesbian, gay, and bisexual populations: An update on empirical research and implications for treatment. *Psychology of Addictive Behaviors, 26*(2), 265–278. https://doi.org/10.1037/a0025424

Hatzenbuehler, M. L., Birkett, M., Van Wagenen, A. & Meyer, I. H. (2014). Protective school climates and reduced risk for suicide ideation in sexual minority youths. *American Journal of Public Health, 104*(2), 279–286. https://doi.org/10.2105/AJPH.2013.301508

Hughes T. L. (2003). Lesbians' drinking patterns: Beyond the data. *Substance Use & Misuse*, *38*(11-13), 1739–1758. https://doi.org/10.1081/ja-120024239

Jiménez-Padilla, B. I. & Alonso-Castillo, M. M. (2022). Revisión sistemática de intervenciones preventivas en ambiente escolar para el consumo de alcohol y tabaco en adolescentes. *Health & Addictions / Salud y Drogas*, *22*(1), 108–121. https://doi.org/10.21134/haaj.v22i1.626

Jorm, A. F., Korten, A. E., Rodgers, B., Jacomb, P. A. & Christensen, H. (2002). Sexual orientation and mental health: Results from a community survey of young and middle–aged adults. *The British Journal of Psychiatry, 180*(5), 423-427.

Kecojevic, A., Wong, C. F., Schrager, S. M., Silva, K., Bloom, J. J., Iverson, E. & Lankenau, S. E. (2012). Initiation into prescription drug misuse: Differences between lesbian, gay, bisexual, transgender (LGBT) and heterosexual high-risk young adults in Los Angeles and New York. *Addictive Behaviors, 37*(11), 1289-1293. https://doi.org/10.1016/j.addbeh.2012.06.006

Kinsey, A. C., Pomeroy, W. B. & Martin, C. E. (1948). *Sexual Behavior in the Human Male.* Saunders.

Lees, B., Meredith, L. R., Kirkland, A. E., Bryant, B. E. & Squeglia, L. M. (2020). Effect of alcohol use on the adolescent brain and behavior. *Pharmacology Biochemistry and Behavior*, *192*, 172906. https://doi.org/10.1016/j.pbb.2020.172906

London-Nadeau, K., Rioux, C., Parent, S., Vitaro, F., Côté, S. M., Boivin, M., Tremblay, R. E., Séguin, J. R. & Castellanos-Ryan, N. (2021). Longitudinal associations of cannabis, depression, and anxiety in heterosexual and LGB adolescents. *Journal of Abnormal Psychology, 130*(4), 333–345. https://doi.org/10.1037/abn0000542

López-Caneda, E., Mota, N., Crego, A., Velasquez, T., Corral, M., Rodríguez-Holguín, S. & Cadaveira, F. (2014). Anomalías neurocognitivas asociadas al consumo intensivo de alcohol (binge drinking) en jóvenes y adolescentes: Una revisión. *Adicciones, 26*(4), 334-359.

Marshal, M. P., Friedman, M. S., Stall, R., King, K. M., Miles, J., Gold, M. A., Bukstein, O. G. & Morse, J. Q. (2008). Sexual orientation and adolescent substance use: A meta-analysis and methodological review. *Addiction, 103*(4), 546-556. https://doi.org/10.1111/j.1360-0443.2008.02149.x

McDonald, K. (2018). Social support and mental health in LGBTQ adolescents: A review of the literature. *Issues in Mental Health Nursing, 39*(1), 16-29. https://doi.org/10.1080/01612840.2017.1398283

Mereish, E. H. (2019). Substance use and misuse among sexual and gender minority youth. *Current Opinion in Psychology, 30*, 123-127. https://doi.org/10.1016/j.copsyc.2019.05.002

Meyer, I. H. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychological Bulletin*, *129*(5), 674–697. https://doi.org/10.1037/0033-2909.129.5.674

Meyer, I. H., Pachankis, J. E. & Klein, D. N. (2021). Do genes explain sexual minority mental health disparities? [Letter to the Editor] *Archives of Sexual Behavior, 50*(3), 731–737. https://doi.org/10. 1007/s10508-020-01909-2

Meyer, I. H. & Wilson, P. A. (2009). Sampling lesbian, gay, and bisexual populations. *Journal of Counseling Psychology, 56*(1), 23–31. https://doi.org/10.1037/a0014587

Negreiros de Carvalho, J., Ballester Brague, L., Valero de Vicente, M. & Amer Fernández, J. (2020). Revisión sistemática de programas de prevención familiar universal: Análisis en términos de eficacia, retención y adherencia. *Adicciones, 33*(4), 359-368. http://dx.doi.org/10.20882/adicciones.1381

National Institute on Drug Abuse. NIDA. (2022a). *Substance Use and SUDs in LGBTQ Populations.* https://nida.nih.gov/research-topics/substance-use-suds-in-lgbtq-populations

National Institute on Drug Abuse. NIDA. (2022b). *The Connection Between Substance Use Disorders and Mental Illness*. National Institute on Drug Abuse. https://nida.nih.gov/publications/research-reports/common-comorbidities-mental-illness

Oficina de las Naciones Unidas contra la Droga y el Delito (UNODC). (2022). Informe Mundial sobre las Drogas 2022. https://www.unodc.org/unodc/es/press/releases/2022/June/unodc-world-drug-report-2022-highlights-trends-on-cannabis-post-legalization--environmental-impacts-of-illicit-drugs--and-drug-use-among-women-and-youth.html

Padilla, Y. C., Crisp, C. & Rew, D. L. (2010). Parental acceptance and illegal drug use among gay, lesbian, and bisexual adolescents: Results from a national survey. *Social Work*, *55*(3), 265–275. https://doi.org/10.1093/sw/55.3.265

Pérez-Albéniz, A., Lucas-Molina, B. & Fonseca-Pedrero, E. (2023). Parental support and gender moderate the relationship between sexual orientation and suicidal behavior in adolescents. *Psicothema*, *35*(3), 248-258. https://doi.org/10.7334/psicothema2022.325

Pesola, F., Shelton, K. H. & van den Bree, M. B. (2014). Sexual orientation and alcohol problem use among U.K. adolescents: An indirect link through depressed mood. *Addiction, 109*(7), 1072–1080. https://doi.org/10.1111/add.12528

Pitman, A., Marston, L., Lewis, G., Semlyen, J., McManus, S. & King, M. (2022). The mental health of lesbian, gay, and bisexual adults compared with heterosexual adults: Results of two nationally representative English household probability samples. *Psychological Medicine, 52*(15), 3402-3411. https://doi.org/10.1017/S0033291721000052

Plan Nacional sobre Drogas (2019). Encuesta sobre el uso de drogas en enseñanzas secundarias en España (ESTUDES) 2018-2019. https://pnsd.sanidad.gob. es/profesionales/sistemasInformacion/sistemaInformacion/pdf/ESTUDES_2018-19_Informe.pdf

Plan Nacional sobre Drogas (2022). Encuesta sobre el uso de drogas en enseñanzas secundarias en España (ESTU-

DES) 2021. https://pnsd.sanidad.gob.es/profesionales/sistemasInformacion/sistemaInformacion/pdf/ESTUDES_2022_Informe.pdf

Plöderl, M. & Tremblay, P. (2015). Mental health of sexual minorities. A systematic review. *International Review of Psychiatry, 27*(5), 367-385. https://doi.org/10.3109/09540261.2015.1083949

Raifman, J., Charlton, B.M., Arrington-Sanders, R., Chan, P. A., Rusley, J., Mayer, K. H., Stein, M. D., Austin S. B. & McConnell, M. (2020). Sexual orientation and suicide attempt disparities among US adolescents: 2009–2017. *Pediatrics, 145*(3), e20191658. https://doi.org/10.1542/peds.2019-1658

Ross, L. E., Salway, T., Tarasoff, L. A., MacKay, J. M., Hawkins, B. W. & Fehr, C. P. (2018). Prevalence of depression and anxiety among bisexual people compared to gay, lesbian, and heterosexual individuals: A systematic review and meta-analysis. *Journal of Sex Research*, *55*(4-5), 435–456. https://doi.org/10.1080/00224499.2017.1387755

Russell, S. T., Driscoll, A. K. & Truong, N. (2002). Adolescent same-sex romantic attractions and relationships: Implications for substance use and abuse. *American Journal of Public Health*, *92*(2), 198–202. https://doi.org/10.2105/ajph.92.2.198

Saha, A., Marbaniang, M.A., Kakoty, M. & Barooah, S. (2023). Perceived risk factors and preventive measures for suicide in lesbian and gay youth. *Journal of Psychosexual Health.* Advance online publication. https://doi.org/10.1177/26318318231174291

Sánchez-Queija, I., Pineda-Balbuena, A., Díez, M. & Parra, A. (2023). El papel mediador de la fuerza del compromiso entre los estilos de procesamiento de la identidad y el bienestar de jóvenes adultos emergentes. *Anales de Psicología, 39*(2), 265–272. https://doi.org/10.6018/analesps.475911

Spittlehouse, J. K., Boden, J. M. & Horwood, L. J. (2020). Sexual orientation and mental health over the life course in a birth cohort. *Psychological Medicine, 50*(8), 1348-1355. https://doi.org/10.1017/S0033291719001284

Talley, A. E., Hughes, T. L., Aranda, F., Birkett, M. & Marshal, M. P. (2014). Exploring alcohol-use behaviors among heterosexual and sexual minority adolescents: Intersections with sex, age, and race/ethnicity. *American Journal of Public Health, 104*(2), 295-303. https://doi.org/10.2105/AJPH.2013.301627

Tubman, J. G., Moore, C., Lee, J. & Shapiro, A. J. (2023). Multivariate patterns of substance use, minority stress and environmental violence associated with sexual revictimization of lesbian and bisexual emerging adult women. *Journal of Lesbian Studies*, *27*, 1-21. https://doi.org/10.1080/10894160.2023.2240552

Wallace, B. C. & Santacruz, E. (2017). Addictions and substance abuse in the LGBT community: New approaches. In R. Richard & S. Erik. *LGBT Psychology and Mental Health: Emerging Research and Advances* (pp. 153-175). Praeger.

Watson, R. J., Park, M., Taylor, A. B., Fish, J. N., Corliss, H. L., Eisenberg, M. E. & Saewyc, E. M. (2020). Associations between community-level LGBTQ-supportive factors and substance use among sexual minority adolescents. *LGBT Health, 7*(2), 82-89. https://doi.org/10.1089/lgbt.2019.0205

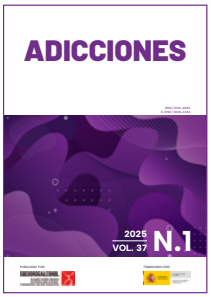
Watson, R. J., Lewis, N. M., Fish, J. N. & Goodenow, C. (2018). Sexual minority youth continue to smoke cigarettes earlier and more often than heterosexuals: Findings from population-based data. *Drug and Alcohol Dependence, 184,* 64-70. https://doi.org/10.1016/j.drugalcdep.2017.11.02

Williams, A. J., Jones, C., Arcelus, J., Townsend, E., Lazaridou, A. & Michail, M. (2021). A systematic review and meta-analysis of victimisation and mental health prevalence among LGBTQ+ young people with experiences of selfharm and suicide. *PLoS ONE 16*(1): e0245268. https://doi.org/10.1371/journal.pone.0245268

Wojdala, A., Molins, F. & Serrano, M. (2020). Estrés y drogadicción: Una perspectiva actualizada para 2020. *Adicciones, 32*(4), 239-242. http://dx.doi.org/10.20882/adicciones.1470

SOCIDROGALCOHOL
Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías

ADICCIONES
2025 ■ VOL. 37 ■ N. 1 ■ PAGES 19–40
www.adicciones.es



ORIGINAL

Systematic review on the characteristics and efficacy of school preventive programs for drug addiction in Spain

Revisión sistemática sobre características y eficacia de los programas preventivos escolares en drogodependencias en España

Víctor José Villanueva-Blasco*,**; Jorge Medina-Martínez*; Javier Zaragoza**,***.

* Faculty of Health Sciences. Valencian International University, Valencia, Spain.
** Spanish Network on Research on Primary Attention on Addiction (RIAPAD), Spain.
*** Faculty of Educational Sciences, University of Zaragoza, Huesca, Spain.

Abstract

The school environment is of great relevance in the prevention of drug use in students because it is where they spend most of their time and, since education is compulsory until upper secondary school in Spain, interventions in this area can reach the majority of children up to that stage. The objective of this systematic review is to determine the level of efficacy of the school preventive programs that have been implemented in Spain. Following the PRISMA recommendations, a systematic literature search was carried out in the Web of Science, PubMed/MEDLINE, Embase, Scopus, and Cochrane Library databases. The search yielded 274 studies, of which 29 studies were selected. It was found that 48 drug addiction prevention programs have been implemented in Spanish school context, of which only 18 (37.5%) had an evaluation of their effectiveness following the criteria and standards of effective prevention. Conversely, the programs that were not evaluated are far from these standards in their design. It is concluded that there are two models of school prevention of drug addiction in Spain: a model that meets this description; and another model classified as "pseudo-prevention", since its design does not meet the standards of effective prevention nor has its preventive efficacy been demonstrated.

Keywords: preventive programs, school setting, intervention, efficacy evaluation, systematic review

Resumen

El ámbito escolar adquiere una gran relevancia en la prevención del consumo de drogas en estudiantes, ya que es donde pasan una mayor parte del tiempo y, puesto que en España la enseñanza es obligatoria hasta los 16 años, las intervenciones en este ámbito pueden alcanzar a la mayoría de niños en esa etapa. El objetivo de esta revisión sistemática fue determinar qué nivel de eficacia presentan los programas preventivos escolares que se han implementado en España. Siguiendo las recomendaciones PRISMA, se llevó a cabo una búsqueda bibliográfica sistemática en las bases de datos Web of Science, PubMed/MEDLINE, Embase, Scopus y Cochrane Library. La búsqueda arrojó 274 estudios, de los cuales fueron seleccionados 29 estudios. Se ha identificado que en España se han implementado 48 programas preventivos en drogodependencias en el contexto escolar, de los cuales tan solo 18 (37,5%) cuentan con evaluación de su eficacia siguiendo los criterios y estándares de una prevención eficaz. Por el contrario, los programas que no han sido evaluados distan en su diseño de estos estándares. Se concluye que en España conviven dos modelos de prevención escolar de las drogodependencias: un modelo que responde a esta denominación; y otro modelo calificado como "pseudo-prevención", dado que su diseño no se ajusta a los estándares de la prevención eficaz ni su eficacia preventiva ha sido demostrada.

Palabras clave: programas preventivos, ámbito escolar, intervención, evaluación de eficacia, revisión sistemática

■ *Received: May 2023; Accepted: October 2023.*
■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Víctor José Villanueva-Blasco. Valencian International University, C/ Pintor Sorolla, 21, 46002, Valencia, Spain. Tel: +34-961.924.993. E-mail: vjvillanueva@universidadviu.com

School-based prevention is one of the most widely-used strategies for guaranteeing that the educational and socio-environmental conditions at school are the most conducive to the healthy development of students. Schools can provide an optimal, efficient and effective environment for intervention (Deogan et al., 2015; Lassi et al., 2015; Pereira & Sanchez, 2018). Universal prevention has a broader focus, according to the classification proposed by Gordon (1987), but one which is less intense than selective and indicated prevention, which target more specific populations with greater problems related to drug use, albeit at greater expense.

Over recent decades, drug addiction prevention programs have proliferated with different characteristics. One of the most widely-used criteria for their classification is the intervention strategy used. Authors such as Tobler (1986) and Tobler et al. (2000) categorised preventive programs into the following typologies: 1) focused on information; 2) focused on affective education; 3) combining information with emotional education; 4) psychosocial in nature; 5) focused on developing resilience skills; 6) focused on developing generic skills (social and life); and 7) focused on the promotion of alternatives (skills and/or activities).

According to international standards for drug use prevention (United Nations Office on Drugs and Crime [UNODC], 2018), the most effective school preventive programs have the following characteristics: they a) are based on models of competency and social influence; b) use interactive methods; c) have a duration of 10-15 structured sessions, with booster sessions; d) are implemented by trained experts; and e) train personal and social skills (such as coping skills, decision-making, and substance use resistance), address risk perceptions, and dispel misconceptions about the normative nature and expectations of substance use.

The set of characteristics of effective school preventive programs specified by Villanueva (2017) (Table 1) is based on various meta-analytic reviews (see Cuijpers, 2002a; Faggiano et al., 2008a; Hansen, 1992; Skara & Sussman, 2003; Thomas et al., 2013; Tobler et al., 2000; Tobler & Stratton, 1997; Winters et al., 2007).

Table 1
Characteristics of effective prevention programs in the school environment

Theoretical foundations	- Proven theoretical model with empirical evidence.
Program Orientation	- Social influence. - Life skills model. - Multicomponent model.
Level of education	- Age-appropriate program implementation. - Greater efficacy if applied between 11 and 14 years of age.
Target sustances	- By age and prevalence of use. - Preferably alcohol and tobacco, followed by cannabis.
Main components	- Negative consequences of short-term use. - Focus on subjective social norm: subjective perception of behaviour and attitudes in the environment regarding drug use. Correction of erroneous conceptions about the prevalence of drug use among peers. - Techniques to cope with indirect social influences and resist social pressure towards drug use. - Training in life skills and positive social interaction. - Reinforcement of attitudes against the use of drugs and personal commitment against drug use.
Methodology	- Active, participatory and interactive.
Sessions	- Minimum recommended number of 10 sessions. - Includes booster sessions once program is completed.
Administrators	- Professional experts. - Suitably trained teachers. - Participation of peers with prosocial profile and against drug use.
Application	- Sustainable in time, long-term. - Application of complete program. - Methodological rigour. - Application of necessary adjustments.
Assessment	- Rigorous assessment essential to reflect positive effects. - Information on missing data. - Behavioural change. - Control group without intervention.
Related aspects	- Gender perspective in design, implementation and assessment. - Consideration of interculturality.

In the Spanish context, a meta-analysis (Espada et al., 2015a) and an assessment of effectiveness based on a review of various meta-analyses (Fernández et al., 2002) identified that the school prevention programs showing greater effectiveness a) included models for education in health and social learning b) addressed the social influence involved in drug use, c) had an active methodology, d) used a combination of oral, written and audiovisual support, e) were implemented by professionals and teachers jointly, with the participation of peers, and f) had booster sessions.

Despite the availability of evidence on what works and what does not work in prevention, the transfer to practical application still seems be a work in progress, with preventive programs of different levels of effectiveness coexisting with programs yet to be assessed (Medina-Martínez & Villanueva-Blasco, 2023). This may be due to the lack of greater visibility and recognition of preventive programs that have been shown to be effective, given that, in the Spanish school context, awareness-raising or information interventions unsupported by empirical evidence continue to be carried out. The National Strategy on Addictions 2017-2024 (Delegación del Gobierno para el Plan Nacional sobre Drogas [DGPNSD], 2018) and the 2021-24 Addictions Action Plan (DGPNSD, 2022) state one of their priorities to be the improvement of the availability and effectiveness of prevention programs based on empirically verified data. These strategies at the national level indicate that the coverage of preventive programs has been decreasing and that they are rather focused on education. As improvements, they therefore propose a greater focus on the social conditions promoting drug use, and that universal coverage of evidence-based programs that meet quality criteria be guaranteed (DGPNSD, 2018).

The following research questions are thus posed: To what extent do preventive programs implemented in Spain show characteristics in line with the standards of effective school preventive programs? Furthermore, in the expectation of finding that some programs comply with the standards while others do not, is the fact of having their efficacy assessed an indicator that the program's design is in accordance with said effective prevention standards? Consequently, the general objective of this systematic review was to determine the level of efficacy of the school preventive programs that have been implemented in Spain. The specific objectives were: 1) to identify the characteristics of school preventive programs applied in Spain; 2) to recognize which ones have been assessed and how effective they are; and, finally, 3) to compare the characteristics of school preventive programs that include efficacy assessment to those that do not.

Method

Search strategy and information sources

For the first objective, a search was carried out in the Xchange portal and best practice databases (EMCDDA, n.d.), evidence-based prevention (Socidrogalcohol, n.d.) and the best practice for addictions portal (DGPNSD, n.d.). For this purpose, country and prevention scope limits were set to target programs carried out in Spain and in the school environment.

For the second objective, a systematic review was carried out on 01/14/2023, applying the criteria as stated in Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) (Page et al., 2021).

A structured electronic bibliographic search was conducted in five databases (Web of Science, PubMed/MEDLINE, Embase, Scopus, and Cochrane Library) to retrieve peer-reviewed articles published in English or Spanish, with no date limit. The search strategy combined multiple previously agreed keywords, which were developed by breaking down the objective. The Population, Intervention, Comparison and Outcomes (PICO) framework was followed in conducting the literature search. References extracted from each of the database searches were grouped and stored in a RefWorks library. Searches were performed and duplicates removed by the lead author of this manuscript.

The search strategy included the keywords "*Spain*", "*alcohol*", "*tobacco*", "*cannabis*", "*school prevention*" and synonyms. These terms were combined creating the following search strategy: "*Spain*" AND ("*school prevention*" OR "*school intervention*" OR "*preventive program*" OR "*school-based*" OR "*school environment*") AND ("*alcohol*" OR "*tobacco*" OR "*cannabis*" OR "*marijuana*"). Additionally, a reverse search was performed by reviewing the reference lists of the studies to identify articles not indexed in these databases.

Similarly, preventive programs with scientific publications on their efficacy but not indexed in good practice portals were also considered as part of the first objective.

Eligibility criteria

Regarding the second objective, two reviewers (M-M and V-B) evaluated the studies that met the following inclusion criteria in the initial search processes: studies that a) included preventive programs in the school environment; b) were carried out in Spain; c) addressed alcohol, tobacco and/or cannabis use; d) were published in peer-reviewed scientific journals; and e) were written in English or Spanish.

Exclusion criteria were: a) articles that addressed behavioural addictions; b) bibliographic and systematic reviews, meta-analyses, books, book chapters and conference communications; c) studies focusing on interventions to reduce drug use without published results; d) preventive interventions not protocolized as a program; and e) studies that did not assess program results.

Selection process

Two authors (M-M and V-B) identified the studies found in three steps following literature guidelines (Gunnell et al., 2020). First, article titles and abstracts obtained in the initial search were screened and selected on the basis of the above disaggregated eligibility criteria. Second, full-text articles were analyzed in detail and screened for eligibility. Third and finally, the bibliographic references of all selected articles were checked manually to identify relevant articles missed in the initial search strategy. The search process is summarized in Figure 1, created using the recently updated PRISMA tool for creating flowcharts (Haddaway & McGuinness, 2020).

The review of scientific articles reporting on studies assessing the efficacy of preventive programs in drug addiction in Spain yielded a total of 274 records. After removing duplicates, 173 studies were obtained for title and abstract review while 134 were excluded. The full text of 39 articles was thus reviewed. After 10 were excluded, the systematic review comprised 29 articles.

Data extraction

Two authors (M-M and V-B) independently and systematically extracted data from the final list of included studies. The following categories of manuscript features were identified and recorded: a) program name, b) authorship, c) year, d) substances, e) target population, f) level of prevention (i.e., universal, selective or indicated), g) theoretical model (e.g., Theory of Reasoned Action, Social Development Model, etc.), h) application methodology (e.g., audiovisual, interactive, etc.), i) number of sessions, j) administrator profile (i.e., faculty, external experts, etc.), k) main components, and l) publications of efficacy. Discrepancies between the authors were resolved by consensus decision. All extracted data were synthesized and grouped using tables created with Microsoft Excel.

Assessment of methodological quality

The methodological quality of the articles was assessed using the Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018). The MMAT is a critical appraisal tool designed for systematic reviews that include quantitative, qualitative, and mixed empirical studies. In the case of randomized controlled trials (RCTs), the RCT scale was used, while the non-randomized quantitative study scale was used in the case of quasi-experimental studies.

The assessment of each study's methodological quality is presented in Tables 2 and 3. All studies met a minimum of 40% of the criteria and the average percentage of criteria met was 67.6%.

Figure 1
Flow chart

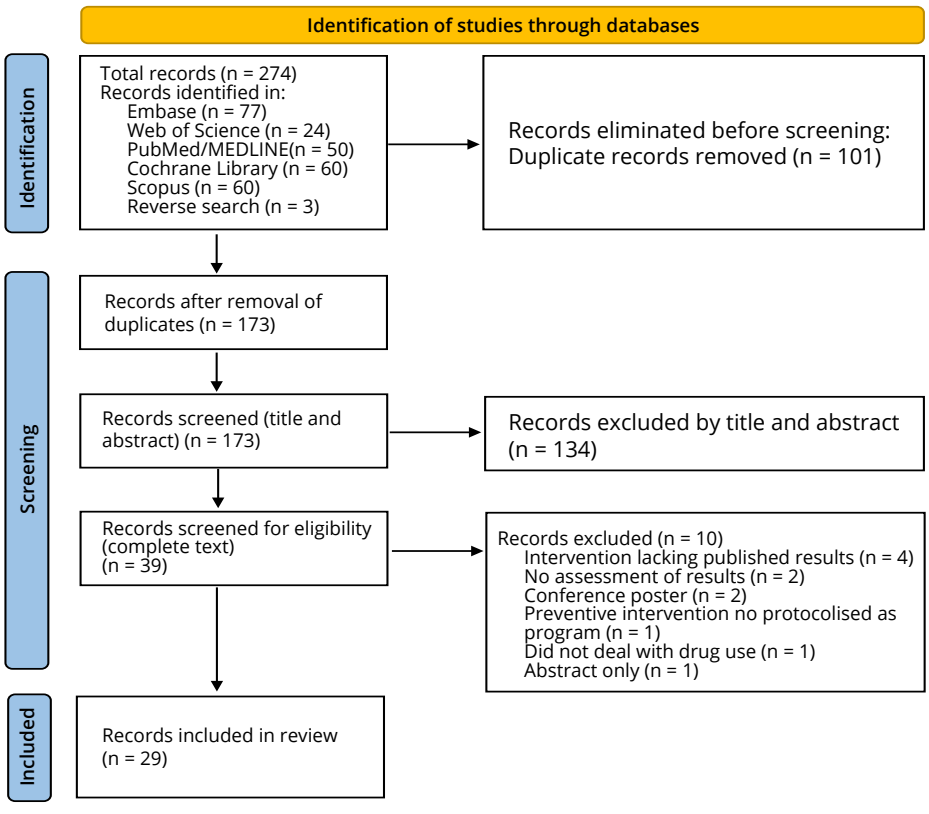


Table 2
Methodological quality assessment for ECA

Reference	P1	P2	P3	P4	P5	% compliance
Alarcó-Rosales et al. (2021)	Yes	Yes	Yes	No	Yes	80
Caria et al. (2011)	Yes	No	Yes	No	Yes	60
Cutrín et al. (2021)	Yes	Yes	Yes	No	Yes	80
Espada et al. (2014)	Yes	Yes	Yes	No	Yes	80
Espada et al. (2015b)	Yes	No	Yes	No	No	40
Faggiano et al. (2007)	Yes	No	Yes	No	Yes	60
Faggiano et al. (2008b)	Yes	No	Yes	No	Yes	60
Faggiano et al. (2010)	Yes	No	Yes	No	No	40
García et al. (2005)	Yes	No	Yes	No	Yes	60
Gonzálvez et al. (2015)	Yes	Yes	Yes	No	No	60
Gonzálvez et al. (2016)	Yes	Yes	Yes	No	No	60
Gonzálvez et al. (2018)	Yes	Yes	Yes	No	Yes	80
Leiva et al. (2018)	Yes	Yes	Yes	Yes	No	80
Luna-Adame et al. (2013)	Yes	No	Yes	No	Yes	60
Romero et al. (2017)	Yes	Yes	Yes	No	Yes	80
Valdivieso et al. (2015)	Yes	Yes	Yes	Yes	No	80
Vargas-Martínez et al. (2019)	Yes	No	Yes	No	No	40
De Vries et al. (2003)	Yes	Yes	Yes	No	Yes	80
De Vries et al. (2006)	Yes	Yes	Yes	No	No	60

Note. P1: Was randomization correctly done? P2: Were the groups comparable at the beginning? P3: Were there complete results data? P4: Were the results assessors blinded to the intervention provided? P5: Did the participants adhere to the assigned intervention?

Table 3
Methodological quality assessment for quasi-experimental studies

Reference	P1	P2	P3	P4	P5	% compliance
Ariza et al. (2008)	Yes	Yes	Yes	No	Yes	80
Ariza et al. (2013)	Yes	Yes	Yes	Yes	Yes	100
Barón-García et al. (2021)	No	No	Yes	No	Yes	40
Cabrera et al. (2022)	Yes	Yes	Yes	No	Yes	80
Calafat et al. (1995)	Yes	Yes	Yes	No	Yes	80
Espada et al. (2012)	No	Yes	Yes	No	Yes	60
Gómez-Fraguela et al. (2002)	Yes	Yes	Yes	No	Yes	80
Hernández et al. (2013)	No	Yes	Yes	No	Yes	60
Moral et al. (2009)	No	Yes	Yes	No	Yes	60
Villanueva et al. (2021)	Yes	Yes	Yes	No	Yes	80

Note. P1: Were participants representative of the target population? P2: Were the measurements suitable to both the result and the intervention (or exposure)? P3: Were there complete results data? P4: Were confounding factors taken into account in design and analysis? P5: During the study period, was the intervention administered (or did exposure occur) as planned?

Results

Table 4 lists the preventive programs identified through good practice portals and through the search for studies assessing their efficacy. Information is provided on authorship and year of publication, substances addressed, target population, level of prevention, underlying theoretical models, application methodology, number of sessions, administrator profiles, main components and the publications found regarding their efficacy.

As can be seen (Table 4), of the total 48 programs analyzed, 41 have a universal prevention frame (83.7%), of which 30 address drinking (73.17%), 29 smoking (70.73%), 16 cannabis (39.02%), and three drugs in general without specifying which (7.32%). Four selective prevention programs were analyzed (8.2%), of which three address drinking (75%), one cannabis use (25%), one general drug use without specifying which ones (25%) and none is focussed on smoking. For indicated prevention, two programs were detected (4.1%), of both of which address drinking (100%), and tobacco (100%), with one addressing cannabis (50%), and none drugs in general. Finally, two programs (4.1%) address various levels of prevention.

Table 4
Information on the preventive programs included in the review

Program	Substance	Target population	Level	Theoretical model	Application methodology	Nº sessions (nº booster sessions)	Administrator profile	Main components	Publication of efficacy
A no fumar ¡me apunto!	Tobacco	Minors aged 12-16, teachers and family	Universal	n.s.	Interactive, participative	n.s.	Teachers	Risks, benefits of not smoking, beliefs, group and advertising pressure, interpersonal and cognitive skills, emotional control	-
ALCAZUL	Alcohol, tobacco, cannabis	Adolescents aged 12-18	Universal	Theory of reasoned action (Fishbein & Ajzen, 1975)	Community	n.s.	Experts and monitors	Healthy leisure, drug information, prosocial attitudes, sensation seeking	-
ALERTA ALCOHOL	Alcohol	Adolescents aged 16-18	Selective	I-change model (de Vries, 2017)	*Online*	6	n.s.	Benefits of not drinking, attitudes, social influences, self-efficacy, resistance skills	Vargas-Martínez et al. (2019)
Cine y Educación en Valores 2.0	Drugs in general (n.s.)	Minors aged 6-16 and their teachers	Universal	n.s.	Audiovisual	n.s.	n.s.	Cinema and values	-
Construyendo Salud	Alcohol, tobacco, cannabis, others	Minors aged 12-14	Universal	Theory of reasoned action (Fishbein The& Ajzen, 1975), Social development model (Hawkins et al., 1992), Theory of self-derogation (Kaplan, 1996), Multi-stage social learning model (Simons et al., 1988), Problem behaviour theory (Jessor & Jessor, 1977), Self-control theory (Hirschi & Gottfredson, 1988),	Interactive, participative	16 (9 booster)	Trained teachers	Information component, decision making, self-image and self-improvement, emotional control, social skills, tolerance and cooperation, leisure and free time	Gómez-Fraguela et al. (2002), Luna-Adame et al. (2013)
Construye tu Mundo	Alcohol, tobacco, cannabis	Minors aged 3-16	Universal	n.s.	Active learning, IVAC	n.s.	Teachers	Empathy, attitudes towards health protection, self-esteem, attitudes towards drugs, decision making, assertiveness	-
Déjame que te cuente algo sobre... Los Porros	Cannabis	Minors aged 13-16	Universal, selective	Theory of reasoned action (Fishbein & Ajzen, 1975)	Interactive	5	Educators/monitors	Informational, attitudinal, normative and affective components of the decision-making balance	-
DINO Educación Preventiva de Drogas para Preadolescentes	Alcohol, tobacco	Minors aged 10-12	Universal	Systemic model of guided intervention (Álvarez, 1987)	Interactive	n.s.	Teachers	Self-esteem, social skills, decision making, information about drugs, social influences, healthy habits	-

Program	Substance	Target population	Level	Theoretical model	Application methodology	Nº sessions (nº booster sessions)	Administrator profile	Main components	Publication of efficacy
DISCOVER. Aprendiendo a vivir	Alcohol, tobacco, cannabis, others	Minors aged 10-16	Universal	n.s.	Interactive	9-13	Trained teachers	Self-esteem, conflict resolution, risks, relational skills, decision making	-
En la huerta con mis amig@s	Alcohol, others	Minors aged 5-10 their families and teachers	Universal	n.s.	Audiovisual	n.s.	Teachers	Healthy habits, psychoaffective and social development	-
En Plenas Facultades	Drugs in general (n.s.)	Young people aged 18-25	Universal	n.s.	Peer to peer	n.s.	Students	Awareness raising about drug abuse and addictions, risky sexual behaviours and sexually transmitted infections	Barón-García et al. (2021)
Entre Todos	Alcohol, tobacco, cannabis	Minors aged 10-16	Universal	n.s.	Cooperative learning	6-13	Experts and trained teachers	Information about drugs, attitudes, values, motivations, self-esteem, social skills, decision making, healthy habits, leisure and free time	-
EmPeCemos	Alcohol, tobacco, cannabis	Minors aged 5-10 and their families	Indicated	n.s.	Interactive	12 (3 booster)	Trained therapists	Emotion recognition, self-control, problem solving and decision making, social skills	Romero et al. (2017)
Galilei	Alcohol, cannabis, others	Adolescents aged 15-21 PCPI (Vocational training)	Selective	Theory of reasoned action (Fishbein & Ajzen, 1975), Problem behaviour theory (Jessor & Jessor, 1977), Social development model (Hawkins et al., 1992)	Interactive	14	Trained teachers	Intentions to use, attitudes to drugs, normative beliefs, effects of drugs, life skills, social and resistance skills, emotional management, impulse control, stress control	-
ITACA	Tobacco	Minors aged 12-16	Universal	Theory of triadic influence (Flay, 1999)	Participative	22	Teachers	Social and advertising influences, information about smoking, resistance skills, emotion management, interpersonal skills, self-esteem, critical thinking, problem solving	Leiva et al. (2018)
Juego de llaves	Alcohol, tobacco, cannabis	Minors aged 11-16	Universal	n.s.	*Online*	6-12	Trained teachers	Emotional management, cognitive strategies, social interaction, leisure and free time, information on drugs, values	-

Program	Substance	Target population	Level	Theoretical model	Application methodology	Nº sessions (nº booster sessions)	Administrator profile	Main components	Publication of efficacy
KAMELAMOS GUINAR - Queremos Contar	Alcohol, others	Roma population: minors aged 6-12, adolescents aged 13-18, women aged 18-32	Selective	Competency model (Albee, 1980)	Interactive	n.s.	Professionals and volunteers	Information about drugs, group pressure resistance skills, leisure and free time	-
La Aventura de la Vida	Alcohol, tobacco, others	Minors aged 6-11	Universal	Life skills education model (WHO, 1994), Theory of reasoned action (Fishbein & Ajzen, 1975), Social development model (Hawkins et al., 1992), Developmental model (Kandel, 1980), Constructivist theory (Piaget, 1962; Vygotsky, 1962)	Audiovisual, interactive	n.s.	Teachers	Information and attitudes towards drugs, risk perception, normative perception, life skills	-
Mantente REAL (anteriormente keepin' it REAL)	Alcohol, tobacco, cannabis	Minors aged 11-15	Universal	n.s.	Participative	12	Teachers	Pressure resistance skills, personal and social skills, communication, assertiveness, problem solving	Cutrín et al. (2021)
Me llamo Marcos. Jóvenes y Estilos de Vida	Alcohol	Adolescents aged 15-18	Universal	n.s.	Audiovisual	n.s.	n.s.	n.s.	-
Nexus. Programa para la prevención del consumo de drogas	Alcohol, tobacco	Minors aged 10-13	Universal	Theory of reasoned action (Fishbein & Ajzen, 1975), Multi-stage social learning model (Simons et al., 1988), Social development model (Hawkins et al., 1992), Developmental model (Kandel, 1980), Problem behaviour theory (Jessor & Jessor, 1977), Theory of self-derogation (Kaplan, 1996), Sensation seeking theory (Zuckerman, 1979)	Interactive, participative	12	Trained instructors	Information on drugs, risk perception, normative beliefs, social influences, resilience skills, communication skills, emotional intelligence, self-esteem, leisure and free time, tolerance and cooperation	-
¡ÓRDAGO! Afrontar el desafío de las drogas	Alcohol, tobacco, cannabis	Minors aged 12-16	Universal	Theory of reasoned action (Fishbein & Ajzen, 1975), Social development model (Hawkins et al., 1992), Developmental model (Kandel, 1980), Constructivist theory (Piaget, 1962; Vygotsky, 1962), Social learning theory (Bandura, 1977a)	Participative	32	Trained teachers	Information on drugs, beliefs, attitudes, social influences, self-esteem, decision making, resistance to group pressure, leisure and free time	-

Program	Substance	Target population	Level	Theoretical model	Application methodology	Nº sessions (nº booster sessions)	Administrator profile	Main components	Publication of efficacy
PASE.bcn (ESFA)	Alcohol, tobacco	Minors aged 12-13	Universal	ASE model (de Vries et al., 1995)	Interactive	7 (6-5 booster)	Trained teachers	Drug effects, group and advertising pressure, normative education, resistance skills, future planning	Ariza et al. (2008), de Vries et al. (2003), de Vries et al. (2006)
Prevención del consumo de drogas	Alcohol, tobacco, cannabis, others	Minors aged 12-17	Universal	Social learning theory (Bandura, 1977a), Developmental model (Kandel, 1980), Health Education Model	Participative	9	Teachers and external professionals (psychologists and pedagogues)	Knowledge about drugs, decision making, social and group pressure	-
Programa de intervención psicosocial	Alcohol	Adolescents aged 12-18	Universal	n.s.	Participative	8	External professionals and trained teachers	Information on drinking, myths, risk perception, social and resistance skills	Moral et al. (2009)
Programa de Prevención de Drogodependencias "CINENSINO"	Alcohol, tobacco	Minors aged 11-13 and their teachers	Universal	Theory of reasoned action (Fishbein & Ajzen, 1975), Susceptibility hypothesis (Mansilla & Vega, 1999)	Participative	12	Teachers	Knowledge about drugs, risks, critical thinking, self-esteem, decision making, assertiveness, resistance to group pressure, healthy leisure	-
Programa de prevención del IAMS	Alcohol, cannabis	Adolescents aged 13-18	Universal	Development theories, ecological perspective & predictive theories of drug use	Interactive, participative	3	External professionals	Information on drugs, social learning and social influences, risk perception	Cabrera et al. (2022)
Programa de promoción de la salud para la prevención del tabaquismo	Tobacco	Minors aged 12-14	Universal	n.s.	Participative	8	Teachers	Effects of smoking, assertiveness, resistance skills, critical thinking	García et al. (2005)
Programa Engoe	Drugs in general (n.s.)	Students aged over 12, teachers, families, young people with problematic use (aged 14-21)	Universal, selective, indicated	Comprehensive-sequential model, multisystemic theory	n.s.	n.s.	External professionals	Emotional and social skills, value education	-
Programa escalonado de prevención escolar - "Protegiéndote"	Alcohol, tobacco, cannabis	Minors aged 3-16, teachers and families	Universal	Biopsychosocial model	Interactive	10	Trained teachers	Information on drugs, emotional control, social skills, problem solving and decision making, habits in school learning	-
Programa de Prevención de Drogodependencias para educación primaria BRÚJULA/ BRÚIXOLA	Alcohol, tobacco, others	Minors aged 6-12 and their families	Universal	Theory of reasoned action (Fishbein & Ajzen, 1975), Theory of planned behaviour (Ajzen, 1985), Health Education Model	Participative	9	Teachers	Healthy habits, social skills, personal identity	-

Program	Substance	Target population	Level	Theoretical model	Application methodology	Nº sessions (nº booster sessions)	Administrator profile	Main components	Publication of efficacy
Programa preventivo en Cataluña	Tobacco	Minors aged 11-15	Universal	n.s.	Participative	7	School nurses	Effects of smoking, social and advertising influence, critical thinking	Valdivieso et al. (2015)
Programa Rompecabezas	Drugs in general (n.s.)	Adolescents aged 16-21 in at-risk situations, teachers in non-formal education centres and vocational training	Selective	Problem behaviour theory (Jessor & Jessor, 1977), Developmental model (Kandel, 1980)	n.s.	n.s.	Teachers and external experts	Information on drugs, leisure and free time, personal development, social skills, responsibility at work	-
Programa Saluda	Alcohol, others	Minors aged 12-14	Universal	n.s.	Participative	10	Teachers, psychologists, social workers and educators, monitors, sociocultural animators	Problem solving and decision making, healthy leisure, social and resilience skills, information on drugs, public engagement, self-reinforcement	Espada et al. (2012), Hernández et al. (2013)
Project EX	Tobacco	Adolescents aged 14-19	Universal	Motivation model, Coping skills, Personal commitment	Participative	8	Teachers and health educators	Self-control, withdrawal control, emotion and stress management, goal setting, self-esteem	Espada et al. (2014), Espada et al. (2015b), Gonzálvez et al. (2015), Gonzálvez et al. (2016), Gonzálvez et al. (2018)
PPCDE	Alcohol, tobacco, others	Pre-school, primary, compulsory secondary, higher secondary students and their teachers	Universal	Theory of reasoned action (Fishbein & Ajzen, 1975), Developmental model (Kandel, 1980), Social learning theory (Bandura, 1977a), Self-efficacy theory (Bandura, 1977b), Lifestyle model and conditioning risk factors (Calafat et al., 1985)	Debate/ discussion, conversations	n.s.	Teachers and external experts	Information on drugs, self-esteem, social and resistance skills, healthy values, decision making, emotional control, healthy leisure	-
RyR2	Alcohol, tobacco, cannabis	Adolescents aged 18	Universal	Cognitive-behavioural and social learning theories	Participative	12-15	External professionals (psychologists and educators)	Problem solving, emotional competences, social influences, critical thinking, empathy, social and negotiation skills, values	Alarcó-Rosales et al. (2021)
Respir@ire	Tobacco	Minors aged 12-16	Universal	Health Education Model	Participative	16	Teachers	Knowledge about drugs, attitudes, social and resistance skills, decision making	-

Program	Substance	Target population	Level	Theoretical model	Application methodology	Nº sessions (nº booster sessions)	Administrator profile	Main components	Publication of efficacy
Sé Tú Mismo/a	Alcohol, tobacco, cannabis	Minors aged 12-14	Universal	Models of social influence and competence	Interactive	10	Experts in drug addiction prevention	Communication skills, emotional education, empathy, assertiveness, normative education, drug information, resistance skills	Villanueva et al. (2021)
Sobre Canyes i Petes (anteriormente xkpts.com)	Alcohol, cannabis	Minors aged 14-16	Universal	ASE model (de Vries et al., 1995)	Interactive	5	Trained teachers	Knowledge about drugs, social and peer pressure, skills training, problem solving	Ariza et al. (2013)
SUSPERTU - Programa de Apoyo a Adolescentes	Alcohol, tobacco, others	Adolescents aged 13-20 in at-risk situations and their families	Indicated	Social learning theory (Bandura, 1977a), Biopsychosocial model	Participative and dynamic	25	External professionals	Knowledge about drugs, attitudes, self-esteem, emotional control, decision making, healthy leisure, social and resistance skills, school performance	-
¿Te apuntas?	Alcohol, others	Minors aged 9-11	Universal	Self-esteem improvement model (Kaplan et al., 1986), Theory of reasoned action (Fishbein & Ajzen, 1975), Developmental model (Kandel, 1980), Social learning theory (Bandura, 1977a), Problem behaviour theory (Jessor & Jessor, 1977)	Participative	5	n.s.	Decision making and problem solving, social and communication skills, critical thinking, leisure and free time	-
Tú decides	Alcohol, tobacco, others	Minors aged 12-16	Universal	Developmental model (Kandel, 1980)	Interactive	6	Trained teachers	Information on drugs, decision making, social and resilience skills	Calafat et al. (1995)
Unplugged	Alcohol, tobacco, cannabis	Minors aged 12-14	Universal	Social influence model (Sussman et al., 2004)	Interactive	12	Trained teachers	Knowledge about drugs, social and resilience skills, normative education, intrapersonal skills, assertiveness, critical thinking, coping strategies, decision making, problem solving, goal setting	Caria et al. (2011), Faggiano et al. (2007), Faggiano et al. (2008b), Faggiano et al. (2010)
¿Vivir el momento?	Alcohol, tobacco	Minors aged 12-14	Universal	n.s.	n.s.	5	n.s.	Problem solving, resilience skills, prosocial values, healthy leisure, critical thinking	-

Program	Substance	Target population	Level	Theoretical model	Application methodology	Nº sessions (nº booster sessions)	Administrator profile	Main components	Publication of efficacy
Y tú, ¿qué piensas?	Alcohol, tobacco, others	Adolescents aged 13-18	Universal	n.s.	Audiovisual, debate	n.s.	n.s.	Leisure and free time, analysis of advertising and fashion, interpersonal skills	-
Y tú, ¿qué sientes?	Drugs in general (n.s.)	Adolescents aged 13-18	Universal	n.s.	Audiovisual, reflection	n.s.	n.s.	Emotional component	-
5 top secrets sobre el cannabis	Cannabis	Adolescents aged 15-18	Universal	Theory of reasoned action (Fishbein & Ajzen, 1975)	Participative	7	Teachers/ educators/ monitors	Information on cannabis, consequences, effects, myths	-

Note. ASE: Attitudes-Social influences-Self-efficacy; ESFA: European Smoking Prevention Framework Approach; IAMS: Madrid Health Service Addiction Institute; IVAC: Research, vision, action and change; n.s.: not specified; PASE.bcn: Prevention of substance addictions at school; RyR2: Reasoning and Rehabilitation V2.

Preventive programs with effectiveness evaluation studies

ALERTA ALCOHOL (ALCOHOL ALERT)

Vargas-Martínez et al. (2019) noted that the program showed a statistically significant reduction in binge drinking after four months of follow-up. This effect was greater the greater the adherence to the program, that is, when a greater number of completed sessions were attended. The intervention did not show a significant increase in health-related quality of life; it was, however, shown that those who reduced the number of binge drinking occasions perceived higher health-related quality of life, as did those with greater adherence to the program.

Construyendo Salud (Building Health)

Gómez-Fraguela et al. (2002) reported that the program achieved a smaller increase in smoking and drinking in the intervention group (IG) compared to the control group (CG), with the effect maintained after 15 months. At follow-up, after 27 and 39 months, these differences seemed to diminish and were no longer significant. The three-year follow-up showed a significant reduction in the level of general use of cannabis, tranquilizers and amphetamines. However, Luna-Adame et al. (2013) reported that no preventive effects on smoking were found, neither immediately nor after a year, but that it could be effective in preventing an increase in the level of tobacco consumption.

EmPeCemos (Let's Get Started)

Romero et al. (2017) reported that participation in the program was associated with more unfavourable attitudes toward drugs and lower intention to use tobacco and alcohol. Significant effects were also observed in smoking prevention, with a lower frequency both in lifetime and last-month smoking in IG. While there were no significant differences in the frequency of alcohol or cannabis use, such differences were found in the amount of alcohol drunk, with a lower number of drinks and episodes of drunkenness in IG compared to CG.

En Plenas Facultades (Of Sound Mind)

Barón-García et al. (2021) reported that program users significantly improved their level of knowledge about drugs and sexuality by the end of the sessions. However, there is no evidence on the effects on drug use behaviour.

ITACA (ITHACA)

Leiva et al. (2018) reported that no statistically significant differences were found in the incidence of regular smoking or smoking initiation in IG and CG. Therefore, there is no evidence that the program is effective in preventing smoking in adolescents.

Mantente REAL (Stay REAL)

Cutrín et al. (2021) noted that relatively smaller increases in drinking were observed in IG compared to CG. There was a statistically significant reduction of binge drinking and episodes of drunkenness, as well as a marginally significant decrease in the frequency and quantity of alcohol drunk. This program was therefore shown to be effective in curbing the increase in drinking at the beginning of adolescence and preventing problematic use.

PASE.bcn (ESFA)

The IG in this program reported significantly less weekly smoking, more anti-tobacco attitudes, as well as significantly higher scores on social self-efficacy and negative intentions toward tobacco (de Vries et al., 2003). The significant effects

for beliefs about the benefits of not smoking continued at 24 and 30 months of follow-up, and were maintained after 30 months for social self-efficacy (de Vries et al., 2006). At 12, 24 and 36 months, the number of new regular smokers was significantly lower in IG (Ariza et al., 2008), although, according to another study (de Vries et al., 2006), this effect disappears in the long term.

Programa de intervención psicosocial (Psychosocial intervention program)

Moral et al. (2009) reported that the program showed a significant reduction in the amount of alcohol drunk weekly at two, seven and 12 months of follow-up. It also showed a strengthening of attitudes against drinking and greater resistance to group pressure. Likewise, in the 12-month follow-up, attitudinal strengthening was maintained in the Family IG and the Basic Awareness IG, showing greater efficacy of the empowerment and skills training programs compared to those that were merely informative.

Programa de prevención del Instituto de Adicciones de Madrid Salud (IAMS) (Prevention program of the Madrid Health Addictions Institute)

Cabrera et al. (2022) reported a significant decrease in IG compared to CG in the intention to drink alcohol and smoke cannabis, as well as in positive attitudes towards their use, and increased risk perception. Furthermore, it showed a significant reduction in drinking in the last month and a reduction in the perception of social pressure. However, regarding cannabis, the differences in its use were not significant and the intervention did not seem to produce changes in self-efficacy to resist consumption.

Programa de promoción de la salud para la prevención del tabaquismo (Health promotion program for smoking prevention)

García et al. (2005) pointed out that there was a smaller increase in smoking experimentation, as well as a lower percentage of daily smokers, in IG compared to CG. Similarly, more negative attitudes toward smoking developed. The program presented positive effects in the short term in modifying attitudes and use, but these decreased in the medium term (eight months of follow-up).

Programa preventivo en Cataluña (Preventive program in Catalonia)

Valdivieso et al. (2015) reported that this program reduced the prevalence and incidence of smoking by 25% and 26%, respectively, but did not find statistical significance. Thus, there is no clear efficacy evidence.

Programa Saluda (Healthy Greetings Program)

The program increased social and problem-solving skills, and reduced short-term substance use intentions (Espada et al., 2012; Hernández et al., 2013). At 12 months, there was a significant reduction in alcohol use (Espada et al., 2012). Hernández et al. (2013) reported that it reduced the percentage of drunken episodes, decreased the perception of social pressure, increased knowledge about alcohol and synthetic drugs, and resulted in a higher percentage of participants carrying out healthy leisure activities (reading and other outdoor activities).

Project EX

The program has been shown to have immediate effects by significantly reducing the intention to smoke, exhaled CO levels, and nicotine dependence (Espada et al., 2014, 2015b; Gonzálvez et al., 2015, 2016, 2018). Similarly, it caused marginal positive effects regarding knowledge about tobacco (Espada et al., 2014) and motivation to quit smoking (Espada et al., 2015b). These factors influenced IG participants to reduce smoking compared to CG (Espada et al., 2015b; Gonzálvez et al., 2015, 2016, 2018) and some to stop smoking (14.28%) (Espada et al., 2015b). These changes were maintained after six months (Espada et al., 2015b) and one year (Gonzálvez et al., 2015, 2016, 2018), which shows the efficacy of the program in reducing long-term tobacco use.

Reasoning and Rehabilitation V2 (RyR2)

Alarcó-Rosales et al. (2021) noted that, at six months, compared to CG, IG showed a significant reduction in daily smoking, drinking (including episodes of drunkenness), and frequency of cannabis use. These positive effects were maintained at 12-month follow-up, although the improvements in daily smoking and drunken episodes showed some reduction.

Sé Tú Mismo/a (Be Yourself)

Villanueva et al. (2021) found that the Be Yourself program was effective in moderating the increase in cannabis use in the last 12 months, so that IG participants were less likely to use than their CG counterparts. Furthermore, the probability of use in the last 30 days decreased in IG compared to previous consumption, while in CG consumption increased. Although the preventive effects decreased at six months of follow-up, IG was still less likely to use cannabis than CG.

Sobre Canyes i Petes (All about Pints and Joints)

Ariza et al. (2013) reported that at the 15-month follow-up, a significant reduction of 29% was observed in past-month cannabis users in IG. These reductions were 34% and 36% when the "acceptable IG" or "qualified IG" subgroups were considered, respectively. That is, greater adherence to program implementation was associated with greater reduction in cannabis use.

Tú Decides (You Decide)

Calafat et al. (1995) point out that there was evidence of a slowdown in the growth curves of alcohol and tobacco use in IG compared to CG, in addition to other positive effects (encouraging active attitudes against drug availability, greater responsibility and willingness to seek help for classmates with drug problems, and improved family communication). Positive effects were still maintained at the two-year follow-up, although moderate drinkers increased in IG. In GC, there was a progressive increase in consumption across the entire study.

Unplugged

This program significantly reduced alcohol-related problem behaviours and drunkenness (Caria et al., 2011; Faggiano et al., 2008b). Despite not showing an overall reduction in drinking, IG non-drinkers and occasional drinkers progressed towards frequent drinking less often than in CG (Caria et al., 2011). At 18 months, the reduced risk of drunken episodes continued to persist (Faggiano et al., 2010).

Regarding tobacco, smoking prevalence was lower in IG, which included activities with parents, compared to CG (Faggiano et al., 2007). Likewise, a reduction in the number of daily cigarettes was shown (Faggiano et al., 2008b). This effect disappeared at 18 months (Faggiano et al., 2010), although the intervention was effective in preventing non-smokers from starting to smoke, compared to CG (Faggiano et al., 2008b, 2010).

With cannabis, the prevalence of use was shown to be significantly lower in IG than in CG (Faggiano et al., 2007), an effect that persisted at 18 months (Faggiano et al., 2010). However, the effects on cannabis use were of marginal statistical significance (Faggiano et al., 2008b).

Comparison of the characteristics of assessed and non-assessed preventive programs

Table 5 presents the comparison of the main defining characteristics of the assessed preventive programs versus those that were not assessed.

Discussion

The present study attempted to discover the extent to which school-based preventive programs implemented in Spain have characteristics in line with the standards of effective school preventive programs, and which ones have been assessed.

In terms of the first objective, determining the characteristics of the school preventive programs applied, it is evident that universal prevention is the most

Table 5
Comparison of characteristics between preventive programs assessed and not assessed

	Programs with efficacy assessment	**Programs lacking efficacy assessment**
Substances	Alcohol (72.22%), tobacco (66.67%), cannabis (44.44%), other (16.67%), n.s. (5.56%)	Alcohol (73.33%), tobacco (63.33%), cannabis (36.67%), other (36.67%), n.s. (13.33%)
Target population	Adolescents aged 12-14	Adolescents aged 10-16, at-risk populations
Level	Universal (88.89%), selective (5.56%), indicated (5.56%)	Universal (80%), selective (10%), indicated (3.33%), various (6.67%)
Theoretical model	Comprehensive social influence models. n.s. (38.89%)	General health education or biopsychosocial models. Some social influence models. n.s. (36.67%)
Application methodology	Interactive (*role-playing*, gamification, debates, group discussions)	Audiovisual, Community, *onlin*e, participative
Nº sessions (nº booster sessions)	8-12 (3-9 booster sessions). n.s. (5.56%)	5-12 (no booster sessions). n.s. (40%)
Administrator profiles	Teachers (61.11%), external professionals (38,89%), school nurses (5.56%), students (5.56%)	Teachers (60%), external professionals (36.67%), volunteers (3.33%), n.s. (20%)
Main components	Information on drugs alongside general life skills training, social and personal skills, emotional control, healthy leisure alternatives, resistance to social and advertising pressure, and normative education	Only emotional component. Only informative component. Only healthy leisure alternatives. Some include general life skills training.

Note. n.s.: not specified.

implemented in Spain, while selective and indicated prevention is in the minority. Nevertheless, according to Offord (2000), selective and indicated prevention programs have some advantages over universal prevention programs, such as the possibility of treating problems earlier and potentially being more efficient; Furthermore, effects have been documented which are up to nine times greater than with universal prevention programs (Bröning et al., 2012). Regardless of the level of prevention, and congruent with Kandel's Stage Theory (1980), it is observed that alcohol is the most frequently addressed substance, followed by tobacco and, lastly, cannabis. School-based preventive programs thus focus mainly on the use of legal drugs and, much less so, on illegal ones.

Regarding the age ranges of the target population, considerable variability was observed. While some programs reported a range of 2-3 years, which would be equivalent to application across two school years, other programs had a higher range, rising to 13 years. This suggests a need to reflect on the suitability of programs and their components for specific ages, as advised by scientific evidence and quality standards (EMCDDA, 2011; Robertson et al., 2004). The application of a preventive program across a broad age range does not seem appropriate since the needs related to substance use are different, as indicated by a variety of theories and authors (i.e., Jessor & Jessor, 1977; Kandel, 1980; Simons et al., 1988). It is also known that risk and protective factors vary with age. (Salvador & de Silva, 2010; U.S. Department of Health and Human Services, 2016). The effectiveness of the different components may therefore be different when working with wide age ranges, complicating the real assessment of their efficacy.

With regard to the theoretical model that these 48 programs use as a reference, which also determines the components involved, wide variability is observed. Most notably, 37.5% did not report a theoretical reference. This fact represents a limitation in compliance with quality standards since the importance of starting from a theoretical model for the design of preventive programs has been indicated (Becoña, 2001). As stated by Vadrucci et al. (2016), any prevention intervention must be based on recognized theories since all hypotheses must be based on theoretical postulates.

Among those studies using a reference model, there is great variability, with some programs focusing more on life skills and social influence components, while others are more focused on informational, emotional and healthy leisure components. In this regard, as pointed out by UNODC (2018) and Villanueva (2017), the evidence indicates that competency and social influence models are the most effective.

In relation to application methodologies, although all programs generated significant changes in knowledge about drugs, non-interactive programs did not have positive effects on attitudes or drug-use behaviour (Fernández et al., 2002). For interactive programs, however, several studies (Cuijpers, 2002b; Fernández et al., 2002; Porath-Waller et al., 2010; Roona et al., 2000; Tobler et al., 2000) have established their efficacy in: a) reducing smoking; b) reducing drinking; c) reducing driving under the influence of alcohol; d) reducing the use of cannabis and other illicit drugs; and e) delaying the age of substance use onset. Therefore, merely informative programs tend to be less effective than those based on social learning theory and having an active methodology (Moral et al., 2005), which is why international prevention standards (UNODC, 2018) recommend adopting interactive methods in preventive programs.

The application intensity of the program or number of sessions, including booster sessions, also varied, as did the application methodologies and the administrator profiles. In relation to the number of sessions, UNODC (2018) and Villanueva (2017) indicate a recommended minimum of 10 structured sessions, with booster sessions. Indeed, programs involving a greater number of sessions have been shown to have a positive impact on the use of both legal and illegal drugs (Soole et al., 2008). However, simply having a greater number of sessions or booster sessions did not mean that a program was necessarily more effective, since efficacy depends largely on the orientation of the program and the methodology used. For its part, given that the positive effects achieved in the short term by preventive interventions usually fade over time, subsequent consolidation or booster sessions are recommended (Fernández et al., 2002; McGrath et al., 2006; Ramos et al., 2010; Robertson et al., 2004).

Regarding administrator profiles, the empirical evidence does not seem to provide a clear answer. Gázquez et al. (2011) did not find significant differences in smoking reduction when the preventive intervention was carried out by teachers as compared to psychologists. Moral et al. (2005) and Espada et al. (2002), however, found greater efficacy when programs were carried out by experts. Likewise, students who have been trained in the prevention of drug use have also been described as a good option (Klepp et al., 1986). Various authors (Espada et al., 2015a; Fernández et al., 2002; Villanueva, 2017) recommended that they be implemented by professionals and teachers together, with the participation of peers. International standards (UNODC, 2018), meanwhile, recommend is that preventive programs should be carried out by a person trained in the field of drug addiction prevention.

In short, the analysis of the characteristics of the school-based preventive programs being applied in Spain leads us to report a wide heterogeneity which, in many cases, does not correspond to the standards of effective school preventive programs.

This finding is linked to the other two study objectives, namely, analysing which preventive programs have been assessed and what their efficacy is, and whether they presented characteristics in line with the evidence on effective preventive programs, as opposed to those programs that were not assessed.

Of the 48 school preventive programs analyzed, only 18 (37.5%) had publications in scientific journals in which their results were assessed. The programs with efficacy evaluations were: Project EX, Unplugged, PASE. bcn, Construyendo Salud, Programa Saluda, ALERTA ALCOHOL, En Plenas Facultades, EmPeCemos, ITACA, Mantente REAL, Programa de intervención psicosocial, Programa de prevención del IAMS, Programa de promoción de la salud para la prevención del tabaquismo, Programa preventivo en Cataluña, RyR2, Sé Tú Mismo/a, Sobre Canyes i Petes, and Tú Decides.

Of these efficacy assessed programs, those shown to be most effective had the following characteristics: a) they are consistent regarding the age of the target population and the components they incorporate, adjusted to the 12-14 year range, where the highest prevalence of use is found for alcohol, tobacco and cannabis, and focusing on these substances; b) they are based on comprehensive social influence models; c) they offer from 7 to 16 sessions and have booster sessions; d) they incorporate components focusing on knowledge and information, social and personal skills (decision making, empathy, effective communication, control of emotions and stress, assertiveness, self-esteem, motivation, problem solving), healthy leisure, resistance to social and advertising pressure, critical thinking, general life skills training and normative education; and e) they are applied using interactive methodologies, including activities such as role-playing and gamification. That is to say, the characteristics of these programs are in line with international standards and previous scientific evidence on effective school preventive programs.

In sum, although there are several considerations to take into account when choosing a preventive program to be implemented in a school, based on the findings of this study, the two programs that were shown to be most effective are Project EX and Unplugged. Their efficacy was consistently supported by several studies, which makes them the best choice for application in the school context. In addition, Unplugged has the advantage that it addresses both alcohol, tobacco and cannabis use, while Project EX focuses exclusively on smoking.

Conversely, preventive programs lacking assessment of their efficacy, or with such assessment limited to the information component, without referring to behavioural change in substance use, have characteristics which are far from congruent with the evidence on effective school-based prevention. Regarding age, their ranges are wide, implying a mismatch between age and the components addressed, given that these programs do not include sessions staggered by age, but rather apply the same program at different ages. They are based mostly on general health education or biopsychosocial models, only occasionally incorporating aspects of social influence models. The number of sessions to be implemented is usually lower than the recommended 10 and booster sessions are generally not contemplated. In this sense, it is also notable that four out of ten programs did not report the number of sessions, which is indicative of a lack of protocolization and planning. The components incorporated were mostly informative, emotional or focused on healthy leisure alternatives; this contrasts with scientific evidence, which has shown that these components offer the lowest level of efficacy or can even be iatrogenic if the information provided is not age-adjusted (Becoña, 2001; Moral et al., 2004). Regarding the application methodology, it is noted that it was usually audiovisual, at community level, online or participatory, none of which allow the level of interaction to be clearly established, which is what has been determined to be most effective.

This study is not without limitations. Firstly, in the majority of cases, the assessment of drug use was carried out using self-completed questionnaires, which may therefore present memory or social desirability biases; however, there are some articles that controlled for the latter bias with the bogus pipeline technique (Luna-Adame et al., 2013). Secondly, some studies had a very small sample (Alarcó-Rosales et al., 2021; Hernández et al., 2013; Romero et al., 2017), so it may not be representative of the target population and the results are difficult to generalize. Thirdly, it is worth highlighting the attrition bias due to participant drop-out in longitudinal studies that were extended over time.

Conclusions

The findings of this study clearly indicate that two school-based drug addiction prevention models coexist in Spain. On the one hand, there is a model based on the design of programs applying the principles and standards of effective prevention, which have also made efforts to demonstrate their efficacy through scientific studies. On the other hand, we have a model that can be described as "pseudo-prevention" (Medina-Martínez & Villanueva-Blasco, 2023), if we understand that addiction prevention is a science and that, consequently, both its design and practice must be based on scientific evidence and the demonstration that it really offers preventive results.

The findings of this study therefore converge with the priority of the Action Plan on Addictions 2021-24 (DGPNSD, 2022), stating the interest in improving the availability and efficacy of prevention programs based on empirically verified data, as well as with the program accreditation process through the best practice for

addictions portal (DGPNSD, n.d.). Socidrogalcohol (n.d.) was a pioneer in Spain in its page on Evidence-Based Prevention, which established categories for programs based on whether or not they had been correctly assessed and whether they showed positive results. These initiatives have guided the way forward to greater awareness of prevention practice within a framework of scientific evidence and best practice. Other complementary initiatives could be to limit public financing only to the implementation of those programs with demonstrated efficacy, and to those whose design is aligned with the principles of effective prevention and are committed to carrying out an assessment of their efficacy. Likewise, it is known that having effective preventive programs is not enough if they are not implemented rigorously or, if adjustments are necessary, that these are informed through a process assessment. Therefore, there is an evident need for the professionalization of prevention through the accreditation of professionals under standardized criteria, or the requirement of university degree qualifications to work in the professional field.

Funding

This study was funded by the Instituto de Salud Carlos III, Red de Investigación en Atención Primaria de Adicciones (RIAPAd; grant RD21/0009/0015).

Conflict of interests

The authors declare no conflict of interest. The funders played no part in study design, in data collection, analysis or interpretation, in the writing of the manuscript, or in the decision to publish the results.

References

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In *Action control* (pp. 11-39). Springer Berlin Heidelberg.

Alarcó-Rosales, R., Sánchez-SanSegundo, M., Ferrer-Cascales, R., Albaladejo-Blazquez, N., Lordan, O. & Zaragoza-Martí, A. (2021). Effects of a school-based intervention for preventing substance use among adolescents at risk of academic failure: A pilot study of the Reasoning and Rehabilitation V2 program. *Healthcare (Basel, Switzerland), 9*(11), 1488. https://doi.org/10.3390/healthcare9111488

Albee, G. W. (1980). A competency model to replace the defect model. In M. Gibbs, J. Lachenmayer & J. Sigal (Eds.), *Community psychology: Theoretical and empirical approaches* (pp. 117-139). Gardner Press.

Álvarez, V. (1987). *Metodología de la orientación educativa* [Methodology of educational guidance]. Alfar.

Ariza, C., Nebot, M., Tomás, Z., Giménez, E., Valmayor, S., Tarilonte, V. & de Vries, H. (2008). Longitudinal effects of the European smoking prevention framework approach (ESFA) project in Spanish adolescents. *European Journal of Public Health, 18*(5), 491-497. https://doi.org/10.1093/eurpub/ckn050

Ariza, C., Pérez, A., Sánchez-Martínez, F., Diéguez, M., Espelt, A., Pasarín, M. I., Suelves, J. M., De La Torre, R. & Nebot, M. (2013). Evaluation of the effectiveness of a school-based cannabis prevention program. *Drug and Alcohol Dependence, 132*(1-2), 257-264. https://doi.org/10.1016/j.drugalcdep.2013.02.012

Bandura, A. (1977a). *Social learning theory*. General Learning Press.

Bandura, A (1977b). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215. https://educational-innovation.sydney.edu.au/news/pdfs/Bandura%201977.pdf

Barón-Garcia, T., Gómez, S., Amatller, O., Bosque-Prous, M. & Espelt, A. (2021). Evaluación del programa de prevención universal de consumo de sustancias y prácticas sexuales de riesgo en población universitaria "En plenas facultades": Estudio cuasiexperimental [Evaluation of the universal prevention program for substance use and risky sexual practices in the university population "In full faculties": A quasi-experimental study]. *Revista Española de Salud Pública, 95*, e202106082. https://www.sanidad.gob.es/biblioPublic/publicaciones/recursos_propios/resp/revista_cdrom/VOL95/ORIGINALES/RS95C_202106082.pdf

Becoña, E. (2001). *Bases teóricas que sustentan los programas de prevención de drogas* [Theoretical bases that support drug prevention programs]. Ministerio del Interior, Delegación del Gobierno para el Plan Nacional sobre Drogas. https://pnsd.sanidad.gob.es/profesionales/publicaciones/catalogo/catalogoPNSD/publicaciones/pdf/bases.pdf

Bröning, S., Kumpfer, K., Kruse, K., Sack, P.-M., Schaunig-Busch, I., Ruths, S., Moesgen, D., Pflug, E., Klein, M. & Thomasius, R. (2012). Selective prevention programs for children from substance-affected families: A comprehensive systematic review. *Substance Abuse Treatment, Prevention, and Policy*, *7*(23). https://doi.org/10.1186/1747-597X-7-23

Cabrera, V., Ordoñez, A., González, I., Civantos, V., Moriano, J. A. & Lloret, D. (2022). Evaluación de la eficacia de un programa de prevención escolar del consumo de alcohol y cannabis entre adolescentes [Evaluation of the effectiveness of a school prevention program for alcohol and cannabis use among adolescents]. *Revista Española de Salud Pública, 96*, e202201004. https://www.sanidad.gob.es/biblioPublic/publicaciones/recursos_propios/resp/revista_cdrom/VOL96/ORIGINALES/RS96C_202201004.pdf

Calafat, A., Amengual, M., Farres, C. & Palmer, A. (1985). Life-style and drug use habits among secondary school students. *Bulletin on Narcotics*, *37*(2-3), 113-123. https://europepmc.org/article/MED/4074998

Calafat, A., Amengual, M., Guimerans, C., Rodríguez-Martos, A. & Ruiz, R. (1995). "Tú decides": 10 años de un programa de prevención escolar ["You decide": 10 years of a school prevention program]. *Adicciones, 7*(4), 509-526. http://www.irefrea.eu/uploads/PDF/Calafat%20et%20al_1995_Tu%20Decides_10%20a%C3%B1os.pdf

Caria, M. P., Faggiano, F., Bellocco, R. & Galanti, M. R. (2011). Effects of a school-based prevention program on European adolescents' patterns of alcohol use. *Journal of Adolescent Health, 48*(2), 182-188. https://doi.org/10.1016/j.jadohealth.2010.06.003

Cuijpers, P. (2002a). Effective ingredients of school-based drug prevention programs: A systematic review. *Addictive Behaviors*, *27*(6), 1009-1023. https://doi.org/10.1016/s0306-4603(02)00295-2

Cuijpers, P. (2002b). Peer-led and adult-led school drug prevention: A meta-analytic comparison. *Journal of Drug Education*, *32*(2), 107-119. https://doi.org/10.2190/LPN9-KBDC-HPVB-JPTM

Cutrín, O., Kulis, S., Maneiro, L., MacFadden, I., Navas, M. P., Alarcón, D., Gómez-Fraguela, J. A., Villalba, C. & Marsiglia, F. F. (2021). Effectiveness of the Mantente REAL program for preventing alcohol use in Spanish adolescents. *Psychosocial Intervention, 30*(3), 113-122. https://doi.org/10.5093/pi2020a19

Delegación del Gobierno para el Plan Nacional sobre Drogas, DGPNSD. (s.f.). *Portal de buenas prácticas en reducción de la demanda de drogas y otras adicciones* [Portal of good practices in reducing the demand for drugs and other addictions]. http://www.buenaspracticasadicciones.es/

Delegación del Gobierno para el Plan Nacional sobre Drogas, DGPNSD. (2018). *Estrategia nacional sobre adicciones 2017-2024* [National strategy on addictions 2017-2024]. DGPNSD. https://pnsd.sanidad.gob.es/pnsd/estrategiaNacional/docs/180209_ESTRATEGIA_N.ADICCIONES_2017-2024__aprobada_CM.pdf

Delegación del Gobierno para el Plan Nacional sobre Drogas, DGPNSD. (2022). *Plan de acción sobre adicciones 2021-24* [Addiction action plan 2021-24]. DGPNSD. https://pnsd.sanidad.gob.es/pnsd/planAccion/docs/PlanASA_2021-24_aprobado.pdf

Deogan, C., Zarabi, N., Stenström, N., Högberg, P., Skärstrand, E., Manrique-Garcia, E., Neovius, K. & Månsdotter, A. (2015). Cost-effectiveness of school-based prevention of cannabis use. *Applied Health Economics Health Policy*, *13*(5), 525-542. https://doi.org/10.1007/s40258-015-0175-4

Espada, J. P., Gonzálvez, M. T., Guillén-Riquelme, A., Sun, P. & Sussman, S. (2014). Immediate effects of Project EX in Spain: A classroom-based smoking prevention and cessation intervention program. *Journal of Drug Education, 44*(1), 3-18. https://doi.org/10.1177/0047237915573523

Espada, J. P., Gonzálvez, M. T., Orgilés, M., Lloret, D. & Guillén-Riquelme, A. (2015a). Meta-analysis of the effectiveness of school substance abuse prevention programs in Spain. *Psicothema*, *27*(1), 5-12. https://doi.org/10.7334/psicothema2014.106

Espada, J. P., Gonzálvez, M. T., Orgilés, M., Guillén-Riquelme, A., Soto, D. & Sussman, S. (2015b). Pilot clinic study of Project EX for smoking cessation with Spanish adolescents. *Addictive Behaviors, 45*, 226-231. https://doi.org/10.1016/j.addbeh.2015.02.009

Espada, J. P., Griffin, K. W., Pereira, J. R., Orgilés, M. & García-Fernández, J. M. (2012). Component analysis of a school-based substance use prevention program in Spain: Contributions of problem solving and social skills training content. *Prevention Science: The Official Journal of the Society for Prevention Research, 13*(1), 86-95. https://doi.org/10.1007/s11121-011-0249-y

Espada, J. P., Méndez, F. X., Botvin, G. J., Griffin, K., Orgilés, M. & Rosa, A. I. (2002). ¿Éxito o fracaso de la prevención del abuso de drogas en el contexto escolar? Un meta-análisis de los programas en España [Success or failure of drug abuse prevention in the school context? A meta-analysis of programs in Spain]. *Psicología Conductual*, *10*(3), 581-602. https://www.behavioralpsycho.com/wp-content/uploads/2020/04/08.Espada_10-3oa.pdf

Espada, J. P., Méndez, F. X. & Hidalgo, M. D. (2003). Cuestionario de consumo [Consumption questionnaire]. In J. P. Espada & F. X. Méndez (Eds.), *Programa Saluda: Prevención del abuso de alcohol y del consumo de drogas de síntesis* [Saluda Program: Prevention of alcohol abuse and synthetic drug use] (pp. 167-168). Pirámide.

European Monitoring Centre for Drugs and Drug Addiction, EMCDDA. (s.f.). *Xchange prevention registry*. https://www.emcdda.europa.eu/best-practice/xchange

European Monitoring Centre for Drugs and Drug Addiction, EMCDDA. (2011). *European drug prevention quality standards: A manual for prevention professionals, EMCDDA manuals 7*. Publications Office of the European Union. www.emcdda.europa.eu/publications/manuals/prevention-standards

Faggiano, F., Galanti, M. R., Bohrn, K., Burkhart, G., Vigna-Taglianti, F., Cuomo, L., Fabiani, L., Panella, M., Perez, T., Siliquini, R, van der Kreeft, P., Vassara, M., Wiborg, G. & the EU-Dap Study Group. (2008b). The effectiveness of a school-based substance abuse prevention program: EU-dap cluster randomised controlled trial. *Preventive Medicine, 47*(5), 537-543. https://doi.org/10.1016/j.ypmed.2008.06.018

Faggiano, F., Richardson, C., Bohrn, K., Galanti, M. R. & EU-Dap Study Group. (2007). A cluster randomized

controlled trial of school-based prevention of tobacco, alcohol and drug use: The EU-dap design and study population. *Preventive Medicine, 44*(2), 170-173. https://doi.org/10.1016/j.ypmed.2006.09.010

Faggiano, F., Vigna-Taglianti, F., Burkhart, G., Bohrn, K., Cuomo, L., Gregori, D., Panella, M., Scatigna, M., Siliquini, R., Varona, L., van der Kreeft, P., Vassara, M., Wiborg, G., Galanti, M. R. & the EU-Dap Study Group. (2010). The effectiveness of a school-based substance abuse prevention program: 18-month follow-up of the EU-Dap cluster randomized controlled trial. *Drug and Alcohol Dependence, 108*(1-2), 56-64. https://doi.org/10.1016/j.drugalcdep.2009.11.018

Faggiano, F., Vigna-Taglianti, F. D., Versino, E., Zambon, A., Borraccino, A. & Lemma, P. (2008a). School-based prevention for illicit drugs use: A systematic review. *Preventive Medicine*, *46*(5), 385-396. https://doi.org/10.1016/j.ypmed.2007.11.012

Fernández, S., Nebot, M. & Jané, M. (2002). Evaluación de la efectividad de los programas escolares de prevención del consumo de tabaco, alcohol y cannabis: ¿Qué nos dicen los meta-análisis? [Evaluation of the effectiveness of school programs for the prevention of tobacco, alcohol and cannabis use: What do the meta-analyses tell us?]. *Revista Española de Salud Pública*, *76*(3), 175-187. http://scielo.isciii.es/scielo.php?script=sci_arttextypid=S1135-57272002000300002ylng=esytlng=es

Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Addison-Wesley.

Flay, B. R. (1999). Understanding environmental, situational and intrapersonal risk and protective factors for youth tobacco use: The Theory of Triadic Influence. *Nicotine and Tobacco Research*, *1*(2), S111-S114. https://doi.org/10.1080/14622299050011911

García, P., Fernández, A., Sánchez, J. M., Carrillo, A., Alcaraz, J. & Abad, E. (2005). Ensayo controlado aleatorizado de un programa de promoción de la salud para la prevención del tabaquismo en un grupo de escolares [Randomized controlled trial of a health promotion program for the prevention of smoking in a group of schoolchildren]. *Revista de Calidad Asistencial, 20*(1), 4-13. https://doi.org/10.1016/s1134-282x(08)74711-0

Gázquez, M., García del Castillo, J. A. & Espada, J. P. (2011). Eficacia diferencial de dos programas de prevención escolar sobre el consumo de tabaco, según el tipo de aplicador [Differential efficacy of two school prevention programs on tobacco consumption, according to the type of applicator]. *Psicothema*, *23*(4), 537-543. http://www.psicothema.es/pdf/3919.pdf

Gómez-Fraguela, J. A., Luengo, Á. & Romero, E. (2002). Prevención del consumo de drogas en la escuela: Cuatro años de seguimiento de un programa [Prevention of drug use at school: Four years of follow-up of a program]. *Psicothema, 14*(4), 685-692. https://www.psicothema.com/pdf/785.pdf

Gonzálvez, M. T., Espada, J. P., Orgilés, M., Soto, D. & Sussman, S. (2015). One-year effects of Project EX in Spain: A classroom-based smoking prevention and cessation intervention program. *PloS One, 10*(6), e0130595. https://doi.org/10.1371/journal.pone.0130595

Gonzálvez, M. T., Espada, J. P., Orgilés, M., Morales, A. & Sussman, S. (2016). Nicotine dependence as a mediator of Project EX's effects to reduce tobacco use in scholars. *Frontiers in Psychology, 7*, 1207. https://doi.org/10.3389/fpsyg.2016.01207

Gonzálvez, M. T., Morales, A., Orgilés, M., Sussman, S. & Espada, J. P. (2018). Role of smoking intention in tobacco use reduction: A mediation analysis of an effective classroom-based prevention/cessation intervention for adolescents. *Addictive Behaviors, 84*, 186-192. https://doi.org/10.1016/j.addbeh.2018.04.013

Gordon, R. (1987). An operational classification of disease prevention. In J. A. Steinberg & M. M. Silverman (Eds.), *Preventing mental disorders* (pp. 20-26). Department of Health and Human Services.

Gunnell, K., Poitras, V. J. & Tod, D. (2020). Questions and answers about conducting systematic reviews in sport and exercise psychology. *International Review of Sport and Exercise Psychology*, *13*(1), 297-318. https://doi.org/10.1080/1750984X.2019.1695141

Haddaway, N. R. & McGuinness, L. (2020). *PRISMA2020: R package and ShinyApp for producing PRISMA 2020 compliant flow diagrams*. https://doi.org/10.5281/ZENODO.4287835

Hansen, W. B. (1992). School-based substance abuse prevention: A review of the state of the art in curriculum, 1980–1990. *Health Education Research*, *7*(3), 403-430. https://doi.org/10.1093/her/7.3.403

Hawkins, J. D., Catalano, R. F. & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, *112*(1), 64-105. https://doi.org/10.1037/0033-2909.112.1.64

Hernández, O., Espada, J. P., Piqueras, J. A., Orgilés, M. & García, J. M. (2013). Programa de prevención del consumo de drogas Saluda: Evaluación de una nueva versión en adolescentes españoles [Saluda drug use prevention program: Evaluation of a new version in Spanish adolescents]. *Health and Addictions / Salud Y Drogas, 13*(2), 135-144. https://doi.org/10.21134/haaj.v13i2.210

Hirschi, T. & Gottfredson, M. R. (1988). Towards a general theory of crime. In W. Buikhuisen & S. A. Mednick (Eds.), *Explaining criminal behaviour. Interdisciplinary approaches* (pp. 88-97). Brill.

Hong, Q. N., Pluye, P., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M.-P., Griffiths, F., Nicolau, B., O'Cathain, A., Rousseau, M.-C. & Vedel, I. (2018). *Mixed Methods Appraisal Tool (MMAT). Version*

2018. McGill University. http://mixedmethodsappraisaltoolpublic.pbworks.com/w/file/fetch/127916259/MMAT_2018_criteria-manual_2018-08-01_ENG.pdf

Jessor, R. & Jessor, S. L. (1977). *Problem behaviour and psychosocial development: a longitudinal study of youth*. Academic Press.

Kandel, D. B. (1980). Developmental stages in adolescent drug involvement. *NIDA Research Monograph*, *30*, 120-127.

Kaplan, H. B. (1996). Empirical validation of the applicability of an integrative theory of deviant behavior to the study of drug use. *Journal of Drug Issues*, *292*, 345-377.

Kaplan, H. B., Johnson, R. J. & Bailey, C. A. (1986). Self-rejection and the explanation of deviance: Refinement and elaboration of a latent structure. *Social Psychology Quarterly*, *49*(2), 110-128. https://doi.org/10.2307/2786723

Klepp, K. I., Halper, A. & Perry, C. L. (1986). The efficacy of peer leaders in drug abuse prevention. *Journal of School Health*, *56*(9), 407-411. https://doi.org/10.1111/j.1746-1561.1986.tb05783.x

Lassi, Z. S., Salam, R. A., Das, J. K., Wazny, M. K. & Bhutta, Z. A. (2015). An unfinished agenda on adolescent health: Opportunities for interventions. *Seminars in Perinatology*, *39*(5), 353-360. https://doi.org/10.1053/j.semperi.2015.06.005

Leiva, A., Estela, A., Bennasar-Veny, M., Aguiló, A., Llobera, J. & Yáñez, A. M. (2018). Effectiveness of a complex intervention on smoking in adolescents: A cluster-randomized controlled trial. *Preventive Medicine*, *114*, 88-94. https://doi.org/10.1016/j.ypmed.2018.06.009

Luna-Adame, M., Carrasco-Giménez, T. J. & Rueda-García M. M. (2013). Evaluation of the effectiveness of a smoking prevention program based on the 'Life Skills Training' approach. *Health Education Research*, *28*(4), 673-682. https://doi.org/10.1093/her/cyt061

Mansilla, F. & Vega, P. (1999). Hipótesis de la susceptibilidad en drogodependencia: Reflexiones para un modelo etiológico [Hypothesis of susceptibility in drug dependence: reflections for an etiological model]. *Revista Española de Drogodependencias*, *24*(1), 17-30. https://www.aesed.com/descargas/revistas/v24n1_2.pdf

McGrath, Y., Sumnall, H., McVeigh, J. & Bellis, M. (2006). Drug use prevention among young people: A review of reviews. Evidence briefing update. *National Institute for Health and clinical excellence*. http://www.cph.org.uk/showPublication.aspx?pubid=216

Medina-Martínez, J. & Villanueva-Blasco, V.J. (2023). Prevention versus pseudo-prevention: A systematic review of school drug prevention and its indexing in best practice portals. *International Journal of Mental Health and Addiction*. https://doi.org/10.1007/s11469-023-01122-x

Moral, M. V., Ovejero, A., Sirvent, C. & Rodríguez, F. J. (2005). Prevención e intervención psicosocial sobre el consumo juvenil de sustancias psicoactivas: Comparación de la eficacia preventiva de cuatro programas [Prevention and psychosocial intervention on the young psychoactive substances constumption: Comparision of four programs preventive efficacy]. *Psychosocial Intervention*, *14*(2), 189-208. http://www.copmadrid.org/webcopm/publicaciones/social/99051.pdf

Moral, M. V., Rodríguez, F. J., Ovejero, A. & Sirvent, C. (2009). Cambios actitudinales y reducción del consumo de alcohol en adolescentes a partir de un programa de intervención psicosocial [Attitudinal changes and reduction of alcohol consumption in adolescents from a psychosocial intervention program]. *Adicciones, 21*(3), 207-219. https://doi.org/10.20882/adicciones.231

Moral, M. V., Sirvent, C., Ovejero, A. & Rodríguez, F. J. (2004). Comparación de la eficacia preventiva de programas de intervención psicosocial sobre las actitudes hacia el consumo juvenil de sustancias psicoactivas [Comparison of the preventive efficacy of psychosocial intervention programs on attitudes towards youth consumption of psychoactive substances]. *Trastornos Adictivos*, *6*(4), 248-261. https://www.elsevier.es/es-revista-trastornos-adictivos-182-pdf-13069836

Offord, D. R. (2000). Selection of levels of prevention. *Addictive Behaviors*, *25*(6), 833-842. https://doi.org/10.1016/s0306-4603(00)00132-5

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S.,... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, *372*(71), 1-9. https://doi.org/10.1136/bmj.n71

Pereira, A. P. D. & Sanchez, Z. M. (2018). Drug use prevention: Factors associated with program implementation in Brazilian urban schools. *BMC Public Health*, *18*, 334. https://doi.org/10.1186/s12889-018-5242-y

Piaget, J. (1962). *Play, dreams, and imitation in childhood*. Norton.

Porath-Waller, A. J., Beasley, E. & Beirness, D. J. (2010). A meta-analytic review of school-based prevention for cannabis use. *Health Education and Behavior*, *37*(5), 709-723. https://doi.org/10.1177/1090198110361315

Ramos, P., Oliva, A., Moreno, C., Lorence, B., Jiménez, A. M., Jiménez, L., Hidalgo, M. V. & Antolín, L. (2010). *Los programas escolares para la prevención del consumo de sustancias. Análisis de las claves que determinan su eficacia* [School programs for the prevention of substance use. Analysis of the keys that determine its effectiveness]. Universidad de Sevilla, Departamento de Psicología Evolutiva y de la Educación. https://personal.us.es/oliva/Libro_drogas.pdf

Roona, M., Streke, A., Ochshorn, P., Marshall, D. & Palmer, A. (2000). Identifying effective school-based substance abuse prevention interventions. In *Background Paper for Prevention 2000 Summit.* Social Capital Development Corporation.

Robertson, E., David, S. & Rao, S. (2004). *Cómo prevenir el uso de drogas en los niños y los adolescentes. Una guía con base*

científica para padres, educadores y líderes de la comunidad [How to prevent drug use in children and adolescents. A science-based guide for parents, educators, and community leaders]. NIDA. https://nida.nih.gov/sites/default/files/redbook_spanish.pdf

Romero, E., Rodríguez, C., Villar, P. & Gómez-Fraguela, X. A. (2017). Intervención sobre problemas de conducta tempranos como prevención indicada del consumo de drogas: Siete años de seguimiento [Intervention for early conduct problems as an indicated prevention of drug use: Seven years of follow-up]. *Adicciones, 29*(3), 150-162. https://doi.org/10.20882/adicciones.722

Salvador, T. & de Silva, A. (2010). *Guía de buenas prácticas y calidad en la prevención de drogodependencias en la comunidad autónoma de la Región de Murcia* [Guide to good practices and quality in the prevention of drug addiction in the autonomous community of the Region of Murcia]. Plan Regional sobre Drogas. http://www.prevencionbasadaenlaevidencia.net/uploads/PDF/EG_Buenaspracticasprevencion_Murcia.pdf

Simons, R. L., Conger, R. D. & Whitbeck, L. B. (1988). A multistage social learning model of the influences of family and peers upon adolescent substance abuse. *Journal of Drug Issues*, *18*(3), 293-315. https://doi.org/10.1177/002204268801800301

Skara, S. & Sussman, S. (2003). A review of 25 long-term adolescent tobacco and other drug use prevention program evaluations. *Preventive Medicine*, *37*(5), 451-474. https://doi.org/10.1016/s0091-7435(03)00166-x

Socidrogalcohol. (s.f.). *Prevención basada en la evidencia. Intervenciones evaluadas* [Evidence-based prevention. Interventions evaluated]. http://www.prevencionbasadaenlaevidencia.net/index.php?page=intervenciones-evaluadas.

Soole, D. W., Mazerolle, L. & Rombouts, S. (2008). School-based drug prevention programs: A review of what works. *Australian and New Zealand Journal of Criminology*, *41*(2), 259–286. https://doi.org/10.1375/acri.41.2.259

Sussman, S., Earleywine, M., Wills, T., Cody, C., Biglan, T., Dent, C. W. & Newcomb, M. D. (2004). The motivation, skills, and decision-making model of "drug abuse" prevention. *Substance Use & Misuse*, *39*(10-12), 1971-2016. https://doi.org/10.1081/ja-200034769

Thomas, R., McLellan, J. & Perera, R. (2013). Programas escolares para la prevención del hábito de fumar [School programs for the prevention of smoking]. *Cochrane Database of Systematic Reviews*. https://doi.org/10.1002/14651858.CD001293.pub3

Tobler, N. S. (1986). Meta-analysis of 143 adolescent drug prevention programs: Quantitative outcome results of program participants compared to a control or comparison group. *Journal of Drug Issues*, *16*(4), 537-567. https://doi.org/10.1177/002204268601600405

Tobler, N. S., Roona, M. R., Ochshorn, P., Marshall, D. G., Streke, A. V. & Stackpole, K. M. (2000). School-based adolescent drug prevention programs: 1998 meta-analysis. *The Journal of Primary Prevention*, *20*(4), 275-336. https://doi.org/10.1023/A:1021314704811

Tobler, N. S. & Stratton, H. H. (1997). Effectiveness of school-based drug prevention programs: A meta-analysis of the research. *Journal of Primary Prevention*, *18*(1), 71-128. https://doi.org/10.1023/A:1024630205999

United Nations Office on Drugs and Crime, UNODC. (2018). *International Standard on Drug Use Prevention. Second updated edition*. UNODC. https://www.unodc.org/documents/prevention/UNODC-WHO_2018_prevention_standards_E.pdf

U.S. Department of Health and Human Services, HHS. (2016). Prevention programs and policies. En *Facing Addiction in America: The Surgeon General's Report on Alcohol, Drugs, and Health*. HHS. https://www.ncbi.nlm.nih.gov/books/NBK424850/

Vadrucci, S., Vigna-Taglianti, F. D., van der Kreeft, P., Vassara, M., Scatigna, M., Faggiano, F., Burkhart, G. & EU-Dap Study Group. (2016). The theoretical model of the school-based prevention programme Unplugged. *Global Health Promotion*, *23*(4), 49-58. https://doi.org/10.1177/1757975915579800

Valdivieso, E., Rey-Reñones, C., Rodriguez-Blanco, T., Ferre, C., Arija, V., Barrera, M. L., Granado-Font, E., Flores-Mateo, G. & the TAB_ES Study Group. (2015). Efficacy of a smoking prevention programme in Catalan secondary schools: A cluster-randomized controlled trial in Spain. *Addiction, 110*(5), 852-860. https://doi.org/10.1111/add.12833

Vargas-Martínez, A. M., Trapero-Bertran, M., Lima-Serrano, M., Anokye, N., Pokhrel, S. & Mora, T. (2019). Measuring the effects on quality of life and alcohol consumption of a program to reduce binge drinking in Spanish adolescents. *Drug and Alcohol Dependence, 205*, 107597. https://doi.org/10.1016/j.drugalcdep.2019.107597

Villanueva, V. J. (2017). Diseño y evaluación de la eficacia de un programa de habilidades para la vida en la prevención del consumo de sustancias en adolescentes [Tesis doctoral] [Design and evaluation of the effectiveness of a life skills program in the prevention of substance use in adolescents [Doctoral thesis]]. Universidad de Santiago de Compostela.

Villanueva, V. J., Puig-Perez, S. & Becoña, E. (2021). Efficacy of the "Sé tú Mismo" (Be Yourself) program in prevention of cannabis use in adolescents. *International Journal of Mental Health and Addiction*, *19*, 1214-1226. https://doi.org/10.1007/s11469-019-00219-6

de Vries, H. (2017). An integrated approach for understanding health behavior; The I-change model as an example. *Psychology and Behavioral Science International Journal*, *2*(2), 1-6. https://doi.org/10.19080/PBSIJ.2017.02.555585

de Vries, H., Backvier, E., Kok, G. & Dijkstra, M. (1995). The impact of social influences in the con-

text of attitude, self-efficacy, intention and previous behavior as predictors of smoking onset. *Journal of Applied Social Psychology*, *25*(3), 237-257. https://doi.org/10.1111/j.1559-1816.1995.tb01593.x

de Vries, H., Dijk, F., Wetzels, J., Mudde, A., Kremers, S., Ariza, C., Duarte, P., Fielder, A., Holm, K., Janssen, K., Lehtovuori, R. & Candel, M. (2006). The European smoking prevention framework approach (ESFA): Effects after 24 and 30 months. Health Education Research, *21*(1), 116-132. https://doi.org/10.1093/her/cyh048

de Vries, H., Mudde, A., Kremers, S., Wetzels, J., Uiters, E., Ariza, C., Duarte, P., Fielder, A., Holm, K., Janssen, K., Lehtovuori, R. & Candel, M. (2003). The European smoking prevention framework approach (ESFA): Short-term effects. *Health Education Research, 18*(6), 649-663. https://doi.org/10.1093/her/cyg033

Vygotsky, L. (1962). *Thought and language.* MIT Press. https://doi.org/10.1037/11193-000

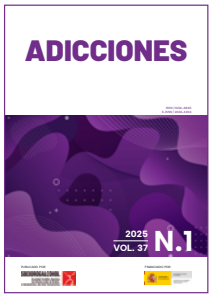
Winters, K. C., Fawkes, T., Fahnhorst, T., Botzet, A. & August, G. (2007). A synthesis review of exemplary drug abuse prevention programs in the United States. *Journal of Substance Abuse Treatment*, *32*(4), 371-380. https://doi.org/10.1016/j.jsat.2006.10.002

World Health Organization, WHO. (1994). *Life skills education for children and adolescents in schools*. WHO. https://apps.who.int/iris/handle/10665/63552

Zuckerman, M. (1979). *Sensation seeking: Beyond the optimal level of arousal*. Erlbaum.

SOCIDROGALCOHOL
Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías

ADICCIONES
2025 ■ VOL. 37 ■ N. 1 ■ PAGES 41–52
www.adicciones.es



ORIGINAL

Delay among opioid users in seeking first addiction treatment

Retraso en el acceso al primer tratamiento para la adicción en usuarios de opiáceos

Carlos Ortega-Muela*; María Rodríguez-Mincholé*; Raquel García-Page*; José Pulido*,**; Jesús Henares-Montiel**,***; Marta Donat**,****; María José Belza**,****; Luis Sordo*,**.

* Departamento de Salud Pública y Materno-Infantil. Facultad de Medicina. Universidad Complutense de Madrid.

** CIBER en Epidemiología y Salud Pública (CIBERESP).

*** Escuela Andaluza de Salud Pública. Granada.

**** Escuela Nacional de Sanidad. Instituto de Salud Carlos III.

Note: The first three authors of this work had the same participation in its development. Their order in authorship was determined randomly.

Abstract

Early treatment seeking for opioid addiction is related to an increased chance of treatment success. New patients seeking treatment, and the time they take to seek it, have scarcely been described in Spain and Europe. The aim of the present study was to identify individual factors related to the delay in seeking treatment for opiate addiction for the first time. A cross-sectional study of opiate users admitted for the first time to treatment for addiction in public centers in the Community of Madrid between 2017-2019 (n = 366) was conducted. The time from the onset of consumption to treatment (TTT) was the dependent variable. A general descriptive analysis of users was performed, followed by a bivariate analysis after dividing the sample into two groups (TTT < 5 years and TTT ≥ 5 years). To identify those factors associated with an increase in TTT, a multivariate logistic regression analysis was performed. The main profile of the study population was: middle-aged, Spanish, unemployed, male, smoked heroin user. The median TTT was: 9.27 years for men and 4.75 for women. Factors associated with higher TTT were: > 49 years (OR: 5.87; 95%CI 1.73-20.00), unemployment (OR: 2.54; 95%CI 1.11-5.83), low educational level (OR: 2.18; 95%CI 1.04-4.59), homelessness (OR: 4.18; 95%CI 1.29-13.57), first use not at home (OR: 2.54; 95%CI 1.11-5.84) and HCV positive (OR: 2.97; 95%CI 1.00-8.82). Delays in seeking treatment are related to older users and lower sociocultural level. People at risk of social exclusion should be prioritized in interventions to facilitate their access to treatment services.

Keywords: opioids, heroin, treatment delay, new drug users, addiction

Resumen

La búsqueda temprana de tratamiento para la adicción a los opiáceos se relaciona con un aumento de las posibilidades de éxito en el mismo. Los nuevos pacientes que buscan este tratamiento, y el tiempo que tardan en demandarlo, han sido escasamente descritos en España y Europa. El objetivo del presente estudio es identificar los factores individuales relacionados con el retraso en acudir por primera vez a tratamiento para la adicción a opiáceos. Se realizó un estudio transversal de consumidores de opiáceos admitidos por primera vez a tratamiento por adicción en centros públicos de la Comunidad de Madrid entre los años 2017-2019 (n = 366). Se estableció como variable dependiente el tiempo desde el inicio del consumo hasta el tratamiento (THT). Se realizó un análisis descriptivo general de los usuarios, seguido de un análisis bivariante tras dividir la muestra en dos grupos (THT < 5 años y THT ≥ 5 años). Para identificar aquellos factores asociados a un aumento en el THT se realizó un análisis de regresión logística multivariante. El perfil principal de la población de estudio fue: varón de mediana edad, español y desempleado que consume heroína por vía fumada. La mediana de THT fue: 9,27 años para varones y 4,75 para mujeres. Los factores que se asocian a un mayor THT fueron: > 49 años (OR: 5,87; IC95% 1,73-20,00), desempleo (OR: 2,54; IC95% 1,11-5,83), bajo nivel educativo (OR: 2,18; IC95% 1,04-4,59), no tener hogar (OR: 4,18; IC95% 1,29-13,57), primer consumo fuera del domicilio (OR: 2,54; IC95% 1,11-5,84) y VHC positivo (OR: 2,97; IC95% 1,00-8,82). El retraso en acudir a tratamiento se relaciona con los usuarios de más edad y menor nivel sociocultural. Las personas en riesgo de exclusión social deben priorizarse en las intervenciones para facilitar su acceso a los servicios de tratamiento.

Palabras clave: opiáceos, heroína, retraso en tratamiento, nuevos usuarios, adicción

■ *Received: January 2023; Accepted: October 2023.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
José Pulido. Departamento de Salud Pública y Materno-Infantil. Facultad de Medicina. Universidad Complutense de Madrid. Plaza Ramón y Cajal s/n, 28040, Madrid. Email: josepuli@ucm.es

At the end of the last century, the use of opioids (essentially heroin) represented a true epidemic throughout Europe, especially in Spain (de la Fuente et al., 2006). In this country, 10.1% of all deaths between 15 and 39 years of age in the early 1990s were attributed to heroin use (de la Fuente et al., 1995). There were two main causes: overdose and infections derived from parenteral use, especially HIV/AIDS (de la Fuente et al., 2003). Although consumption seems to have stabilized in recent decades (Cicero et al., 2014; Mur Sierra & Ortigosa Gómez, 2014; Observatorio Español de las Drogas y las Adicciones, 2022; Sánchez-Niubò et al., 2009; Sanvisens et al., 2014), the widespread increase in the use of opioid drugs (Salazar et al., 2020) makes it especially important to improve both the early detection systems of possible increases in use, as well as to improve the treatment and harm reduction systems for users. Needle exchange programs, changing from injecting to smoking, and the arrival of highly active antiretrovirals were factors which helped to reduce the morbidity and mortality rate drastically starting in the mid-1990s (Torrens et al., 2013). Nevertheless, it was starting treatment, especially treatment with opioid agonists, that was the key element for these users. It reduced overdoses and disease transmission (HIV, HBV, HCV) and improved the quality of life of users (Brugal et al., 2005; Torrens et al., 1999). However, many patients in need of treatment do not seek it, and when they do, they take a long time, which is related to a worse prognosis in the development of the disease (Molist et al., 2018). The causes that users point out as being barriers to seeking treatment range from their feeling of being able to deal with their use issues on their own, to the stigma associated with treatment and the distrust regarding its effectiveness or the lack of flexibility (Farhoudian et al., 2022; Hall et al., 2021; Mowbray et al., 2010). However, there are few studies (Larance et al., 2018) that attempt to determine the demographic or clinical factors linked to the delay in seeking treatment, and none in the European context. Knowing which predictors are related to the delay in seeking treatment would allow us to identify populations in which to prioritize interventions. The objective of this study is thus to identify the factors related to the delay in seeking treatment in new patients who use opioids.

Methods

Design, population and data collection

This is a cross-sectional study of all patients who requested treatment for opioid addiction for the first time in any of the public CAD/CAID centres (treating addictions and substance-dependent users) in the Community of Madrid during the years 2017, 2018 and 2019.

User information was extracted from data from the cumulative registry of drug addicts (CRDA) protocol. The CRDA protocol is a questionnaire administered to every individual requesting treatment after the diagnosis of their addiction on their first visit to the centre.

The inclusion criteria in this study were being addicted to heroin and/or another opioid (ICD-10) and not having been previously treated in a CAD/CAID centre. The addiction diagnosis is made by the CAD/CAID doctor treating patients on reception. Of the 4,040 patients who sought treatment in the three years mentioned, 3,325 had opioid addiction as an ICD diagnosis. Of these 3,325, only 393 declared that this was their first treatment, and the main variable (TTT) was recorded for 366 of them, who therefore constituted the study population.

Design and variables

In the patients selected, considering the age of admission to treatment and the age of onset of use of the main drug, the dependent variable could be calculated: time elapsed from initial consumption to starting treatment (time to treatment, TTT).

After establishing that the distribution of this variable was non-normal, it was converted to a categorical variable, taking as a reference greater than or equal to, or less than 5 years of TTT. This figure has been used in previous articles in similar populations and healthcare contexts (Bargagli et al., 2006; Larance et al., 2018) and has been shown to be a point in time separating better and worse prognoses (Molist et al., 2018).

The independent variables analyzed were those collected in the CRDA on completion by the doctor taking the first visit of each user. These were 1) sociodemographic variables: sex, age, nationality (Spanish or foreign), employment status (in work or unemployed), place of residence (house/flat/apartment or absence of own home), living arrangements (with a partner and/or children, family of origin or alone), marital status (married/with a partner or single), presence/absence of children, referral source (voluntary, social-health referral or compulsory) and level of education (above or below secondary education); 2) variables related to substance use: main drug of use (heroin or other opioids), route of administration (parenteral or other), frequency of administration (daily or non-daily) and use of other drugs in the last 30 days (alcohol, cannabis, cocaine, other opioids, benzodiazepines and other stimulants); 3) characteristics related to the onset of use of the main substance: the person who provided it for the first time (family/partner, friends or others) and the place of first consumption (home or others). Finally, 4) clinical variables: serological status for HIV (negative, positive or unknown), HCV (negative, positive or unknown), HBV (non-immune, immune or unknown) and presence of sexually transmitted diseases (negative, positive or unknown).

Data analysis

A descriptive analysis of the sample was carried out to establish the general characteristics of the study population. With the aim of identifying the factors associated with a delay in seeking treatment for opioid addiction, a bivariate analysis was first performed, estimating the odds ratio (OR) and 95% confidence intervals (95% CI) with the $\chi 2$ test of each of the variables previously described in the groups according to TTT. Those factors with a significance of less than 0.05 in the bivariate analysis were entered into a multivariate logistic regression model to determine the predictors of delay in entering treatment. All analyses were performed with the SPSS 25 program.

Results

The study population's baseline characteristics were: 80.6% men, 43.4% aged between 36 and 49 years, with an average age of 39 (SD: 10.6 years), 33.9% foreigners, 73.8% unemployed, and 50.1% had completed at least secondary education. Regarding marital status, 28.7% were married or had a partner and 18.9% had a child (Table 1). In terms of substance use, heroin was the main opioid for 83.3%. In 77.1% of cases, the main opioid was used daily. Smoking was the most common route of administration (69.7%), with the parenteral route used in 10.5% of cases. In addition to opioids, 42.1% took more than one substance, with cocaine standing out (29.5%). In relation to the onset of use, 69.4% obtained the drug for the first time through friends and only 7.4% obtained it through family members or a partner. First use was in places other than home for 85% (Table 2). Those who did not know their serological status in relation to HIV and HCV comprised 46.7% and 45.6% of the sample, respectively, with 4.4% being positive for HIV and 12% for HCV (Table 3).

Regarding the dependent variable, 57.9% entered treatment 5 or more years after starting to use, with the mean and median TTT being 11.8 years (SD: 11.4) and 8, respectively (Figure 1). Men had a mean and median of 12.7 years (SD: 11.8) and 9.21, while women had figures of less than 8.1 years (SD: 8.2) and 4.75, respectively.

According to the bivariate analysis, the factors correlating with a greater delay in TTT were: being a man (OR=1.66; 95% CI 0.98-2.79), being older, with an OR of those over 49 years of age versus those under 35 of 4.61 (95% CI 2.31-9.20), and being a native of Spain versus a foreigner (OR=1.56 (95% CI 1.00-2.41)). Unemployment, low level of education, lack of one's own home and living alone increased TTT by 1.9, 2.8, 3.25 and 4.44 times, respectively (95% CI 1.18-3.05; 95% CI 1.79-4.37; 95% CI 1.81-5.83; 95% CI 2.24-8.81) (Table 1).

Both non-daily use of opioids and the heroin as the main opioid were related to higher TTT (OR=1.69; 95% CI 1.01-2.83 and OR= 2.10; 95% CI 1.21- 3.67, respectively). The parenteral route also affected the delay (OR= 2.6; 95% CI 1.19-5.56) (Table 2).

Finally, in the bivariate analysis, positive HIV serology was linked to greater delay (OR=12.4; 95% CI 1.60-95.86), as was HCV positivity (OR=4.83; 95% CI % 2.03-11.49) (Table 3).

After multivariate logistic regression models were run, age was linked to delay. In the group of users over 49 years of age, there was a 5.87 times (95% CI 1.73-20.00) higher risk of seeking attention later compared to those under 35 years of age. A direct relationship was established between delay in seeking help and being out of work (OR: 2.54; 95% CI 1.11-5.83), the lack of education above primary level (OR: 2.18; 95% CI 1.04 - 4.59) and the lack of one's own home (OR: 4.18; 95% CI 1.29-13.57). Using the opioid in a place other than home also turned out to be decisive, with a 2.54 times higher risk (95% CI 1.11-5.84), as was HCV positivity (OR: 2.97; 95% CI % 1.00-8.82).

Table 1
Sociodemographic characteristics and years from onset of opioid use to treatment (TTT)

	Total		TTT ≥5 years		TTT <5 years		*OR (95% CI)*
	n	*%*	**n**	**%**	**n**	**%**	
Sex							
Female	71	19.4	34	47.9	37	52.1	*1*
Male	295	80.6	178	60.3	117	39.7	*1.66* (0.98 - 2.79)*
Age							
≤ 35	142	38.8	66	46.5	76	53.5	*1*
36-49	159	43.4	94	59.1	65	40.9	*1.67*** (1.06 - 2.63)*
≥ 50	65	17.8	52	80.0	13	20.0	*4.61*** (2.31 - 9.20)*
Country of birth							
Foreign	123	33.9	62	50.4	61	49.6	*1*
Spanish	240	66.1	147	61.3	93	38.8	*1.56** (1.00 - 2.41)*
Employment							
In work	96	26.2	44	45.8	52	54.2	*1*
Unemployed	261	73.8	161	61.7	100	38.3	*1.9** (1.18 – 3.05)*
Place of residence							
House, flat or apartment	286	78.1	149	52.1	137	47.9	*1*
Institutions or on the street	77	21	60	77.9	17	22.1	*3.25*** (1.81 - 5.83)*
Living arrangements							
Partner and/or children	126	35.3	58	46.0	68	54.0	*1*
Family of origin	102	28.6	52	51.0	50	49.0	*1.22*** (0.72 - 2.10)*
Single	67	18.8	53	79.1	14	20.9	*4.44*** (2.24 - 8.81)*
Other	62	17.4	42	67.7	20	32.3	*2.46*** (1.30 - 4.66)*
Marital status							
Married, unmarried partner	103	28.7	52	50.5	51	49.5	*1*
Other/unknown	256	71.3	156	60.9	100	39.1	*1.53* (0.97 - 2.43)*
Children							
No	297	81.1	169	56.9	128	43.1	*1*
Yes	69	18.9	43	62.3	26	37.7	*1.25 (0.73 - 2.15)*
Referral source							
Voluntary	212	59.4	121	57.1	91	43.1	*1*
Social-health services	86	24.1	50	58.1	36	41.9	*1.10 (0.63 - 1.74)*
Compulsory	59	16.5	33	55.9	26	44.1	*1. 00 (0.53 - 1.71)*
Level of education attained							
Secondary or higher	172	50.1	81	47.1	91	52.9	*1*
Primary or lower	171	49.9	122	71.3	49	28.7	*2.80*** (1.79 - 4.37)*

*p<0.10; **p<0.05; ***p<0.01.

Table 2
Substance use and years from onset of opioid use to treatment (TTT)

	Total		TTT ≥5 years		TTT <5 years		*OR (95% CI)*
	n	*%*	**n**	*%*	**n**	*%*	
Main opioid							
Other opioid	61	16.7	26	42.6	35	57.4	*1*
Heroin	305	83.3	186	61.0	119	39.0	*2.10*** (1.21 - 3.67)*
Frequency of main opioid use							
Every day	276	77.1	151	54.7	125	45.3	*1*
Not every day	82	22.9	55	67.1	27	32.9	*1.69** (1.01 - 2.83)*
Parenteral use[1]							
No	325	89.5	180	55.4	145	44.6	*1*
Yes	38	10.5	29	76.3	9	23.7	*2.60** (1.19 - 5.66)*
First use facilitated by							
Family/partner	26	7.4	15	57.7	11	42.3	*1*
Friends	243	69.4	152	62.6	91	37.4	*1.23 (0.54 - 2.78)*
Others	81	23.1	36	44.4	45	55.6	*0.59 (0.24 - 1.43)*
Place of first use							
Home	50	15	19	38.0	31	62.0	*1*
Other	283	85	175	61.8	108	38.2	*2.64** (1.42 - 4. 99)*
Use of other drugs							
No	212	57.9	120	56.6	92	43.4	*1*
Yes	154	42.1	92	59.7	62	40.3	*1.14 (0.75 - 1.73)*
Use of other drugs[2]							
Cocaine							
No	224	61.2	128	57.1	96	42.9	*1*
Yes	142	38.8	84	59.2	58	40.8	*1.10 (0.71 - 1.66)*
Cannabis							
Yes	28	7.7	14	50.0	14	50.0	*1*
No	338	92.3	198	58.6	140	41.4	*1.41 (0.65 - 3.06)*
Alcohol							
No	343	93.7	194	56.6	149	43.4	*1*
Yes	23	6.3	18	78.3	5	21.7	*2.77** (1.00 - 7.62)*
Benzodiazepines							
No	357	97.5	204	57.1	153	42.9	*1*
Yes	9	2.5	8	88.9	1	11.1	*6.00* (0.74 - 48.47)*

*p<0.10; **p<0.05; ***p<0.01. 1: For more detail on these variables, see Annex 1. 2: last 30 days.

Table 3
Health status and years from the onset of opioid use to treatment (TTT)

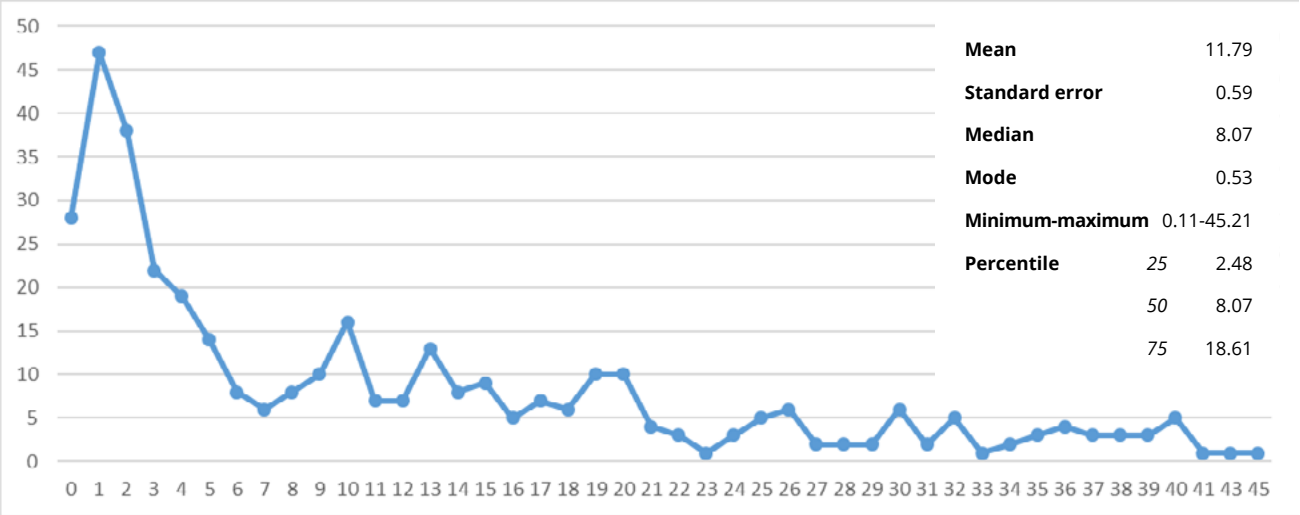
	Total		TTT ≥5 years		TTT <5 years		*OR (95% CI)*
	n	**%**	**n**	**%**	**n**	**%**	
HIV							
Negative	179	48.9	98	54.7	81	45.3	*1*
Positive	16	4.4	15	93.8	1	6.3	*12.4*** (1.60 - 95. 86)*
Unknown	171	46.7	99	57.9	72	42.1	*1.14*** (0.75 - 1.74)*
HCV							
Negative	155	42.3	81	52.3	74	47.7	*1*
Positive	44	12	37	84.1	7	15.9	*4.83*** (2.03 - 11.49)*
Unknown	167	45.6	94	56.3	73	43.7	*1.18*** (0.76 - 1.83)*
HBV							
Not immune	86	23.5	46	53.5	40	46.5	*1*
Immune	60	16.4	35	58.3	25	41.7	*1.22 (0.63 - 2.37)*
Unknown	220	60.1	131	59.5	89	40.5	*1.28 (0.78 - 2.11)*
STD							
No	191	52.2	109	57.1	82	42.9	*1*
Yes	4	1.1	3	75.0	1	25.0	*2.26 (0.23 - 22.10)*
Unknown	171	46.7	100	58.5	71	41.5	*1.10 (0.70 - 1.61)*

*p<0.10; **p<0.05;***p<0.01.

Table 4
Factors related to delay in entering treatment

	Time from the onset of opioid use to treatment ≥ 5 years					
Variables	**β**	**OR**	**OR (95% CI)**			***p***
Age						
Age < 35 years	Ref.					
Age 35-49 years	-0.023	0.977	0.439	_	2.172	*0.954*
Age > 49 years	1.770	5.872	1.725	_	19.995	*0.005*
Hepatitis C virus positive						
Negative	Ref.					
Positive	1.089	2.970	1.000	_	8.820	*0.050*
Place of first use						
Home	Ref.					
Other	0.933	2.543	1.108	_	5.833	0.028
Place of residence						
House, flat or apartment	Ref.					
Institutions or on the street	1.430	4.179	1.287	_	13.566	*0.017*
Level of studies attained						
Secondary or higher	Ref.					
Primary or lower	0.780	2.182	1.039	_	4.586	*0.039*
Employment						
In work	Ref.					
Unemployed	0.933	2.543	1.108	_	5.833	*0.028*

Figure 1
Number of patients (y) by years from onset of use to treatment (X) (N = 366)



Discussion

This is the first study to examine at a European level the sociodemographic predictors linked to a longer period of time from the beginning of opioid use to seeking treatment in addicts to this substance. Among them, older age, unemployment, not having a home and having a low educational level stand out.

In comparison to other user studies in this context (Puigdollers et al., 2004; Sánchez-Carbonell & Seus, 2000; Sanvisens et al., 2014), the present research yielded a novel profile by updating it to 2019 on the one hand, and by describing opioid addicts seeking treatment for the first time on the other. The average profile of this sample is a 39-year-old male, without children, who lives in his own home and who is unemployed when he comes to the centre. Although the population group is "new treatment seekers", this pattern mostly overlaps with what has been described in previous studies. Being male, with a high rate of unemployment and low educational level have predominated in all studies (de la Fuente et al., 2005; Puigdollers et al., 2004; Sánchez-Carbonell & Seus, 2000; Sanvisens et al., 2014). We have new users, but beyond being somewhat younger than those who were already in treatment, it does not seem that the profile has changed a great deal up to 2019.

Apart from characterizing the population in question, the main findings of this study focus on the time from the onset of use to the time when treatment is first sought (TTT), a variable that requires discussion from the start. Studying TTT is an approximation to the study of treatment delay in which it is assumed that there is a direct population-based link between TTT and the time from the start of addiction to the start of treatment (Degenhardt et al., 2019; Kessler et al., 2001; Larance et al., 2018). Despite some heterogeneity in studies on the life trajectories of users (Hall et al., 2021; Kessler et al., 2001), it has been described that an average of three years elapses from first use to addiction, and between five (Bargagli et al., 2006; Darke, 2011, Shand et al., 2011) and eight years (Best et al., 2008) to the start of treatment. It is also relevant to underline that the entire population of the present study attended treatment. It does not have a control group of people who did not attend; it compares those who sought help early to those who went late, a subject barely studied until now (Larance et al., 2018). In fact, only one previous Spanish study could be found which determined the time between the onset of use and start of treatment (Flórez et al., 2015) in first-time patients. While that study's average of 10.9 years is very similar to ours, their objectives differ in not focusing on determining the associated factors.

One of the key findings of this study is that women sought treatment almost five years earlier than men. At a descriptive level, the finding that women had lower TTT corresponds to previous studies (Darke, 2011). This 'advance' in seeking treatment has been explained in different ways. One of them is that there are greater social expectations for women (the double standard hypothesis (Marks & Clark, 2018)) that lead to greater stigma about their addiction and the resulting earlier search for treatment. Another is the so-called telescoping effect (Marks & Clark, 2018; Ridenour et al., 2005), the acceleration in the addiction process from first use. However, when the multivariate analysis was performed in our study, gender disappeared. That is, the clear advance in women's TTT is explained by factors other than gender. The factors of age, housing, education or unemployment are what seem to condition this reality.

While we cannot generalize much more than a context of universal healthcare and education, this is a striking result, although one that has been described before in different environments (Kessler et al., 2001; Larance et al., 2018; Stoltman et al., 2015). It seems that, indeed, women go to treatment earlier, but for reasons of differential characteristics compared to men.

Something similar was detected with the variable serological HIV status. It seems that being HIV+ is related to higher TTT, and yet it disappeared in the multivariate analysis. HIV infection was closely related to parenteral use, which is currently in very minor use both in this sample and in Spain (Observatorio Español de las Drogas y las Adicciones, 2022). We can thus surmise that HIV status is more a marker of older age (which does appear related to higher TTT) than a factor determining the delay in seeking treatment. Furthermore, HIV patients who have good adherence to antiretrovirals have good quality of life (González-Álvarez et al., 2019), and all our patients are of course in contact with the health services. However, it could be the other way around: greater delay in treatment facilitates the continuation of risky practices that entail the transmission of HIV.

In connection with age as a risk factor, we must highlight the possibility of an important cohort effect in these studies. Starting to use in the 1990s or in 2010 conditions many of the subsequent characteristics of use, as well as possible related infections. Our study indicates that greater age means greater TTT delay. It shows us on which population to focus interventions, but it also tells us that certain generations of users may have differential characteristics on the basis of the time they starting using (Degenhardt et al., 2019). Beyond the possible cohort effect, previous studies have described that the youngest patients seek treatment the most (Kessler et al., 2001). The present study offers a further nuance to this result: it is not just that they look for it more, but rather that they look for it sooner.

In contrast to HIV, there was a relationship between delay in seeking treatment and positive hepatitis C. It may be thought that this result is linked to the fact that the infection is now curable: it is therefore the patients who have not been treated for it who have been more distant from healthcare services or have been reinfected (Valencia et al., 2019). It could be interpreted as them delaying treatment for their addiction in the same way that they did for hepatitis C, which is available and free in Spain. It may be that this infection is a marker of worse care follow-up or greater separation from society (Vallejo et al., 2015). In any case, in this study, seropositivity to hepatitis C is more indicative than HIV as a marker of delay.

It is not easy to interpret how first use outside the home is related to greater TTT. There are articles that discuss the places where heroin is first injected (Day et al., 2005; Roy et al., 2002), but there are no references to first non-injected use. It could indicate that use in environments with greater normalization delays the demand for help. It is precisely these environments in which structural or contextual factors would also contribute to making access to treatment difficult (Farhoudian et al., 2022). Therefore, such first use outside the home could be a marker of the environment in which users live, but it is a hypothesis that must be confirmed by further research.

Our analyses have shown that having a low educational level, being unemployed and not having a home are independent markers of delay in seeking out centres, just as they were for not going to them in other studies (Blanco et al., 2015). These variables all reflect a situation of social exclusion. In this case, the relevance of social determinants on the health of the population, such as access to health services, is once again highlighted, both before and after the COVID-19 crisis (Bonifonte & Garcia, 2022; López-Pelayo et al., 2020).

There are several limitations of this study. In addition to what has already been said about the meaning of TTT, the age of onset of use was self-reported, i.e., not exempt from possible memory biases, although there does not seem to be any other way to find out the age of first use. Secondly, it is a cross-sectional study, which therefore limits causal relationships. Thirdly, caution must be taken when generalizing from the results obtained. The scope of this study is patients undergoing treatment in public centres, so its results cannot be generalized to private settings. However, Madrid is a region in which access to treatment is both widely available and predominantly used, thanks to a 'diversified public healthcare network' (Subdirección General de Adicciones, 2017). Finally, perhaps the most relevant limitation is that the data originated in a registry used as an epidemiological indicator and therefore does not contain all the variables that could have been of interest.

The present results point out those factors that were associated with a delay in attending treatment. As a common element, these seem to reflect a situation of marginalization or social degradation, most likely related to a certain style of long-term heroin use, while at the same time serving to identify a group at high risk of delay in seeking treatment. These findings suggest the need to improve active case search strategies, as well as the analysis of access barriers, especially in disadvantaged neighbourhoods and environments. This is a time of uncertainty given the increase in the use of medicinal opioids (Salazar et al., 2020) and the fear of a possible transfer to an increase in addictions. This is why healthcare services must remain extremely accessible and have the fewest possible barriers, so that patients may be cared for and, at the same time, possible increases in their number may be detected.

Acknowledgements

This study was financed by a project under the auspices of the Instituto de Salud Carlos III - Acción Estratégica en Salud, co-financed by the European Regional Development Fund (ERDF) (PI19/00982).

Conflict of interests

The authors declare no conflict of interests.

References

Bargagli, A. M., Faggiano, F., Amato, L., Salamina, G., Davoli, M., Mathis, F., Cuomo, L., Schifano, P., Burroni, P. & Perucci, C. A. (2006). VEdeTTE, a longitudinal study on effectiveness of treatments for heroin addiction in Italy: Study protocol and characteristics of study population. *Substance Use & Misuse*, *41*(14), 1861-1879. https://doi.org/10.1080/10826080601025482.

Best, D. W., Day, E., Cantillano, V., Lopez Gaston, R., Nambamali, A., Sweeting, R. & Keaney,F. (2008). Mapping heroin careers: Utilising a standardised history-taking method to assess the speed of escalation of heroin using careers in a treatment-seeking cohort. *Drug and Alcohol Review*, *27*(2), 165 - 170. https://doi.org/10.1080/09595230701829488.

Blanco, C., Iza, M., Rodríguez-Fernández, J. M., Baca-García, E., Wang, S. & Olfson, M. (2015). Probability and predictors of treatment-seeking for substance use disorders in the U.S. *Drug and Alcohol Dependence*, *149*, 136-144. https://doi.org/10.1016/j.drugalcdep.2015.01.031.

Bonifonte, A. & Garcia, E. (2022). Improving geographic access to methadone clinics. *Journal of Substance Abuse Treatment*, *141*, 108836. https://doi.org/10.1016/j.jsat.2022.108836.

Brugal, M. T., Domingo-Salvany, A., Puig, R., Barrio, G., García de Olalla, P. & de la Fuente, L. (2005). Evaluating the impact of methadone maintenance programmes on mortality due to overdose and aids in a cohort of heroin users in Spain. *Addiction (Abingdon, England)*, *100*(7), 981-989. https://doi.org/10.1111/j.1360-0443.2005.01089.x.

Cicero, T. J., Ellis, M. S., Surratt, H. L. & Kurtz, S. P. (2014). The changing face of heroin use in the United States: A retrospective analysis of the past 50 years. *JAMA Psychiatry*, *71*(7), 821-826. https://doi.org/10.1001/jamapsychiatry.2014.366.

Darke, S. (2011). *The Life of the Heroin User: Typical Beginnings, Trajectories and Outcomes*. Cambridge University Press.

Day, C. A., Ross, J., Dietze, P. & Dolan, K. (2005). Initiation to heroin injecting among heroin users in Sydney, Australia: Cross sectional survey. *Harm Reduction Journal*, *2*(1), 2. https://doi.org/10.1186/1477-7517-2-2.

de la Fuente de Hoz, L., Brugal Puig, M. T., Ballesta Gómez, R., Bravo Poetela, M. J., Barrio Anta, G., Domingo Salvany, A., Silva, T. & Ambrós, M. (2005). [Cohort study methodology of the ITINERE Project on heroin users in three Spanish cities and main characteristics of the participants]. *Revista española de salud pública*, *79*(4), 475-491.

de la Fuente, L., Barrio, G., Vicente, J., Bravo, M. J. & Santacreu, J. (1995). The impact of drug-related deaths on mortality among young adults in Madrid. *American Journal of Public Health*, *85*(1), 102-105. https://doi.org/10.2105/ajph.85.1.102.

de La Fuente, L., Bravo, M. J., Barrio, G., Parras, F., Suárez, M., Rodés, A. & Noguer, I. (2003). Lessons from the history of the human immunodeficiency virus/acquired immunodeficiency syndrome epidemic among Spanish drug injectors. *Clinical Infectious Diseases : An Official Publication of the Infectious Diseases Society of America*, *37 Suppl 5*, S410-415. https://doi.org/10.1086/377562.

de la Fuente, Luis, Brugal, M. T., Domingo-Salvany, A., Bravo, M. J., Neira-León, M. & Barrio, G. (2006). [More than thirty years of illicit drugs in Spain: A bitter story with some messages for the future]. *Revista española de salud pública*, *80*(5), 505-520. https://doi.org/10.1590/s1135-57272006000500009.

Degenhardt, L., Bharat, C., Glantz, M. D., Sampson, N. A., Al-Hamzawi, A., Alonso, J., Andrade, L., Bunting, B., Cia, A., de Girolamo, G., de Jonge, P., Demyttenaere, K., Gureje, O., Haro, J. M., Harris, M., He, Y., Hinkov, H., Nasser, A., Karam, E.,… Kessler, R. C. (2019). Association of cohort and individual substance use with risk of transitioning to drug use, drug use disorder, and remission from disorder: Findings from the World Mental Health surveys. *JAMA Psychiatry*, *76*(7), 708-720. https://doi.org/10.1001/jamapsychiatry.2019.0163.

Farhoudian, A., Razaghi, E., Hooshyari, Z., Noroozi, A., Pilevari, A., Mokri, A., Mohammadi, M. & Malekinejad, M. (2022). Barriers and facilitators to substance use disorder treatment: An overview of systematic reviews. *Substance Abuse : Research and Treatment*, *16*, 11782218221118462. https://doi.org/10.1177/11782218221118462.

Flórez, G., López-Durán, A., Triñanes, Y., Osorio, J., Fraga, J., Fernández, J. M. & Arrojo, M. (2015). First-time admissions for opioid treatment: Cross-sectional and descriptive study of new opioid users seeking treatment. *Neuropsychiatric Disease and Treatment*, *11*, 2431-2440. https://doi.org/10.2147/ndt.S84431.

González-Álvarez, S., Madoz-Gúrpide, A., Parro-Torres, C., Hernández-Huerta, D. & Ochoa Mangado, E. (2019). Relationship between alcohol consumption, whether linked to other substance use or not, and antiretroviral treatment adherence in HIV+ patients. *Adic-*

ciones, *31*(1), 8-17. https://doi.org/10.20882/adicciones.916.

Hall, N., Le, L., Majmudar, I., Teesson, M. & Mihalopoulos, C. (2021). Treatment-seeking behaviour among people with opioid use disorder in the high-income countries: A systematic review and meta-analysis. *PloS One*, *16*(10), e0258620. https://doi.org/10.1371/journal.pone.0258620.

Hall, N. Y., Le, L., Majmudar, I. & Mihalopoulos, C. (2021). Barriers to accessing opioid substitution treatment for opioid use disorder: A systematic review from the client perspective. *Drug and Alcohol Dependence*, *221*, 108651. https://doi.org/10.1016/j.drugalcdep.2021.108651.

Kessler, R. C., Aguilar-Gaxiola, S., Berglund, P. A., Caraveo-Anduaga, J. J., DeWit, D. J., Greenfield, S. F., Kolody, G., Olfson, M. & Vega, W. A. (2001). Patterns and predictors of treatment seeking after onset of a substance use disorder. *Archives of General Psychiatry*, *58*(11), 1065-1071. https://doi.org/10.1001/archpsyc.58.11.1065.

Larance, B., Gisev, N., Cama, E., Nelson, E. C., Darke, S., Larney, S. & Degenhardt, L. (2018). Predictors of transitions across stages of heroin use and dependence prior to treatment-seeking among people in treatment for opioid dependence. *Drug and Alcohol Dependence*, *191*, 145-151. https://doi.org/10.1016/j.drugalcdep.2018.03.056.

López-Pelayo, H., Aubin, H.-J., Drummond, C., Dom, G., Pascual, F., Rehm, J., Saitz, R., Scafato, E. & Gual, A. (2020). «The post-COVID era»: Challenges in the treatment of substance use disorder (SUD) after the pandemic. *BMC Medicine*, *18*(1), 241. https://doi.org/10.1186/s12916-020-01693-9.

Marks, K. R. & Clark, C. D. (2018). The telescoping phenomenon: Origins in gender bias and implications for contemporary scientific inquiry. *Substance Use & Misuse*, *53*(6), 901-909. https://doi.org/10.1080/10826084.2017.1385079.

Molist, G., Brugal, M. T., Barrio, G., Mesías, B., Bosque-Prous, M., Parés-Badell, O. & de la Fuente, L. (2018). Effect of ageing and time since first heroin and cocaine use on mortality from external and natural causes in a Spanish cohort of drug users. *The International Journal on Drug Policy*, *53*, 8-16. https://doi.org/10.1016/j.drugpo.2017.11.011.

Mowbray, O., Perron, B. E., Bohnert, A. S. B., Krentzman, A. R. & Vaughn, M. G. (2010). Service use and barriers to care among heroin users: Results from a national survey. *The American Journal of Drug and Alcohol Abuse*, *36*(6), 305-310. https://doi.org/10.3109/00952990.2010.503824.

Mur Sierra, A. & Ortigosa Gómez, S. (2014). [Is it possible a new heroin consumption epidemic in Spain?]. *Medicina clínica*, *143*(9), 398-400. https://doi.org/10.1016/j.medcli.2014.06.004.

Observatorio Español de las Drogas y las Adicciones (2022). *Informe 2022. Alcohol, tabaco y drogas ilegales en España*. Madrid: Ministerio de Sanidad. Delegación del Gobierno para el Plan Nacional sobre Drogas.

Subdirección General de Adicciones (2017). *Plan de Adicciones de la ciudad de Madrid 2017-2021*. Ayuntamiento de Madrid. Madrid: Madrid Salud.

Puigdollers, E., Domingo-Salvany, A., Brugal, M. T., Torrens, M., Alvarós, J., Castillo, C., Magri, N., Martin, S. & Vázquez, J. M. (2004). Characteristics of heroin addicts entering methadone maintenance treatment: Quality of life and gender. *Substance Use & Misuse*, *39*(9), 1353-1368. https://doi.org/10.1081/ja-120039392.

Ridenour, T. A., Maldonado-Molina, M., Compton, W. M., Spitznagel, E. L. & Cottler, L. B. (2005). Factors associated with the transition from abuse to dependence among substance abusers: Implications for a measure of addictive liability. *Drug and Alcohol Dependence*, *80*(1), 1-14. https://doi.org/10.1016/j.drugalcdep.2005.02.005.

Roy, E., Haley, N., Leclerc, P., Cédras, L. & Boivin, J. F. (2002). Drug injection among street youth: The first time. *Addiction (Abingdon, England)*, *97*(8), 1003-1009. https://doi.org/10.1046/j.1360-0443.2002.00161.x.

Salazar, A., Moreno, S., De Sola, H., Moral-Munoz, J. A., Dueñas, M. & Failde, I. (2020). The evolution of opioid-related mortality and potential years of life lost in Spain from 2008 to 2017: Differences between Spain and the United States. *Current Medical Research and Opinion*, *36*(2), 285-291. https://doi.org/10.1080/03007995.2019.1684251.

Sánchez-Carbonell, X. & Seus, L. (2000). Ten-year survival analysis of a cohort of heroin addicts in Catalonia: The EMETYST project. *Addiction (Abingdon, England)*, *95*(6), 941-948. https://doi.org/10.1046/j.1360-0443.2000.95694110.x.

Sánchez-Niubò, A., Fortiana, J., Barrio, G., Suelves, J. M., Correa, J. F. & Domingo-Salvany, A. (2009). Problematic heroin use incidence trends in Spain. *Addiction (Abingdon, England)*, *104*(2), 248-255. https://doi.org/10.1111/j.1360-0443.2008.02451.x.

Sanvisens, A., Rivas, I., Faure, E., Muñoz, T., Rubio, M., Fuster, D., Tor, J. & Muga, R. (2014). [Characteristics of heroin dependent patients admitted to a methadone treatment program]. *Medicina clínica*, *142*(2), 53-58. https://doi.org/10.1016/j.medcli.2012.10.023.

Shand, F. L., Degenhardt, L., Slade, T. & Nelson, E. C. (2011). Sex differences amongst dependent heroin users: Histories, clinical characteristics and predictors of other substance dependence. *Addictive behaviors*, *36*, 27-36. https://doi.org/10.1016/j.addbeh.2010.08.008.

Stoltman, J. J. K., Woodcock, E. A., Lister, J. J., Greenwald, M. K. & Lundahl, L. H. (2015). Exploration of the telescoping effect among not-in-treatment, intensive heroin-using research volunteers. *Drug and Alcohol De-*

pendence, *148*, 217-220. https://doi.org/10.1016/j.drugalcdep.2015.01.010.

Torrens, M., Domingo-Salvany, A., Alonso, J., Castillo, C. & San, L. (1999). Methadone and quality of life. *Lancet (London, England)*, *353*(9158), 1101. https://doi.org/10.1016/S0140-6736(05)76462-X.

Torrens, M., Fonseca, F., Castillo, C. & Domingo-Salvany, A. (2013). Methadone maintenance treatment in Spain: The success of a harm reduction approach. *Bulletin of the World Health Organization*, *91*(2), 136-141. https://doi.org/10.2471/BLT.12.111054.

Valencia, J., Alvaro-Meca, A., Troya, J., Cuevas, G., Gutiérrez, J., Morro, A., Alvarez, J., Pulido, L., Cañamares, I., Escobar, I., Moreno, S. & Ryan, P. (2019). High rates of early HCV reinfection after DAA treatment in people with recent drug use attended at mobile harm reduction units. *The International Journal on Drug Policy*, *72*, 181-188. https://doi.org/10.1016/j.drugpo.2019.06.016.

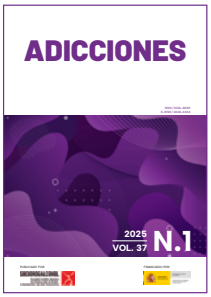
Vallejo, F., Barrio, G., Brugal, M. T., Pulido, J., Toro, C., Sordo, L., Espelt, A. & Bravo, M. J. (2015). High hepatitis C virus prevalence and incidence in a community cohort of young heroin injectors in a context of extensive harm reduction programmes. *Journal of Epidemiology and Community Health*, *69*(6), 599-603. https://doi.org/10.1136/jech-2014-205070.

Annex 1. Development of variables related to substance use

	Total		Use ≥5		Use <5		*p*
	n	%	n	%	n	%	
Opioid administration							
Parenteral	38	10.5	29	76.3	9	23.7	*Ref.*
Oral	46	12.7	21	45.7	25	54.3	*0.002*
Smoked	253	69.7	139	54.9	114	45.1	*0.006*
Intranasal	23	6.3	18	78.3	5	21.7	*0.560*
Other	3	0.8	2	66.7	1	33.3	*0.578*
Use of other substances (last 30 days)							
No	212	57.9	120	56.6	92	43.4	*Ref.*
Alcohol	13	3.6	10	76.9	3	23.1	*0.123*
Cannabis	6	1.6	3	50	3	50	*0.530*
Cocaine	108	29.5	60	55.6	48	44.4	*0.475*
Other opioids	24	6.6	18	75	6	25	*0.042*
Benzodiazepines	2	0.5	1	50	1	50	*0.681*
Other stimulants	1	0.3	0	0	1	100	*0.436*

SOCIDROGALCOHOL
Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías

ADICCIONES
2025 ■ VOL. 37 ■ N. 1 ■ PAGES 53–60
www.adicciones.es



ORIGINAL

Problematic Internet use among adults: A longitudinal European study

Uso problemático de internet entre adultos: Un estudio europeo longitudinal

Olatz López-Fernández *, **, ***, ****, *****; Lucía Romo ******, *******; Amélie Rousseau ********; Bernadeta Lelonek-Kuleta *********; Joanna Chwaszcz *********; Niko Männikkö **********, **********; Ann-Kathrin Gässler **********; Zsolt Demetrovics **********, **********; Sophia Achab **********, **********; Daria J. Kuss **********, **********; Mark D. Griffiths**********, **********.

* Department of Methodology in Behavioural Sciences, Faculty of Psychology, Universidad Nacional de Educación a Distancia, Madrid, Spain.** Faculty of Psychology, Universidad Complutense de Madrid (UCM), Madrid, Spain. *** Faculty of Psychology and Education, Universidad Francisco de Vitoria, Madrid, Spain. **** Centro de Estudios Universitarios Cardenal Cisneros – UCM, Madrid, Spain. ***** Hospital Universitario Fundación Jiménez Díaz, Servicio de Psiquiatría, Madrid, Spain. ****** EA 4430 CLIPSYD Université Paris Nanterre, Paris, France. ******* Hôpital Universitaire Raymond Poincaré, AP-HP Garches, CESP, Garches, France. ******** Psychology Department, Université Toulouse Jean Jaurès, 31058 Toulouse, France. ********* Department of Psychology, The John Paul II Catholic University of Lublin, Lublin, Poland. ********** Faculty of Medicine, University of Oulu, Oulu, Finland. ********** Centre for Research and Innovation, Oulu University of Applied Sciences, Oulu, Finland. ********** Psychotherapeutical Office Pilgramm, Hannover, Germany. ********** Institute of Psychology, ELTE Eötvös Loránd University, 1064 Budapest, Hungary. ********** Centre of Excellence in Responsible Gaming, University of Gibraltar, Gibraltar. ********** Specialized Treatment Centre ReConnecte, University Hospitals, Geneva, Switzerland. ********** Sociological and Psychological-Research Unit, Department of Psychiatry, University of Geneva, Geneva, Switzerland. ********** Cyberpsychology Research Group, Nottingham Trent University, Nottingham, UK. ********** International Gaming Research Unit, Nottingham Trent University, Nottingham, UK.

Abstract

There are few cross-cultural studies utilizing longitudinal analysis to explore problematic internet use (PIU), and almost none among adults. The present follow-up study compared three waves across 12-month period every six months and observed the natural course and trajectory of PIU in a European multi-country sample of adults from 11 countries (Finland, Germany, Italy, Spain, France, Switzerland, Hungary, Poland, UK, Norway, Belgium). A total of 139 participants (45.5% females) provided data across all three waves with an average age of 26.14 years (*SD* = 5.92). There were longitudinal effects in PIU, with statistical differences between at-risk users compared to healthy users in Waves 1 and 2, and Waves 1 and 3. The analyses of variance showed a longitudinal effect of waves on the PIU symptoms. PIU was significantly affected by time and type of user, with those classed as at-risk having higher scores than healthy users, although PIU decreased over time. In addition, the type of PIU detected in adults contained mild addictive symptoms. In conclusion, this study demonstrated that PIU was generally low among European adult population and tended to decrease over the one-year period, what contrasts with adolescent population findings.

Keywords: Internet addiction, problematic Internet use, longitudinal research, Europe, adults

Resumen

Existen pocos estudios transculturales que utilizan análisis longitudinales para explorar el uso problemático de internet (PIU), y apenas existen estudios en población adulta. El presente estudio de seguimiento ha comparado tres observaciones a lo largo de un período de 12 meses, una cada seis meses. Se observó el curso natural y la trayectoria del PIU en una muestra europea de adultos de 11 países (Finlandia, Alemania, Italia, España, Francia, Suiza, Hungría, Polonia, Reino Unido, Noruega, Bélgica). 139 participantes (45,5 % mujeres) con una edad promedio de 26,14 años (DE = 5,92) proporcionaron datos en las tres observaciones. Se detectaros efectos longitudinales en el PIU, con diferencias estadísticas entre usuarios en riesgo en comparación con usuarios sanos en las observaciones 1 y 2, y las correspondientes a las observaciones 1 y 3. Los análisis de varianza mostraron un efecto longitudinal de las observaciones en los síntomas del PIU. Se halló que el PIU fue significativamente afectado por los factores del tiempo y del tipo de usuario, y aquellos participantes clasificados como en posible riesgo de PIU obtuvieron puntuaciones más altas que los usuarios sanos, aunque el PIU disminuyó con el tiempo en ambos grupos. Además, el tipo de PIU detectado en adultos contenía una sintomatología adictiva leve. En conclusión, este estudio demostró que el PIU fue generalmente bajo entre la población adulta europea y, además, tendió a disminuir durante el período de un año, lo que contrasta con los resultados en población adolescente.

Palabras clave: adicción a internet, uso problemático de internet, investigación longitudinal, Europa, adultos

■ *Received: April 2023; Accepted: November 2023.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Olatz López-Fernández. Departamento de Metodología de las ciencias del comportamiento, Facultad de Psicología. Universidad Nacional de Educación a Distancia. C. de Juan del Rosal, 10, Moncloa - Aravaca, 28040, Madrid. Email: lopez.olatz@gmail.com

Contemporary research suggests that problematic internet use (PIU) is on the rise globally (Carbonell et al., 2009; Carbonell et al., 2016; Lopez-Fernandez, 2015; Sixto-Costolla et al., 2021; Tran et al., 2020) with specific online activities (such as online gaming and social media use) being its main driver (Pontes et al., 2015). For a small minority, the internet's immersive and interactive qualities through specific devices offer rewarding virtual experiences that can make such activity very time-consuming (Aboujaoude, 2010), even problematic. Research examining PIU has focused on the Internet's negative consequences on individuals' everyday functioning, including educational/occupational duties, social relationships and/or emotional well-being (Anderson, 2001). Over the past three decades, the internet and the applications on it have rapidly developed and become more accessible, the reason for which why more research is needed regarding the natural course of PIU over time (Aboujaoude, 2010, Anderson et al., 2017).

A systematic review on longitudinal research trends regarding internet use and PIU (Anderson et al., 2017) suggested such research has tended to concentrate on PIU among adolescents and emerging adults examining areas such as (i) lack of internet control and excessive time online, (ii) compulsive use of online applications, (iii) addictive behaviors regarding how PIU impacts the individual, and (iv) which internet applications are the most abused (typically online gaming). Very little of the longitudinal research concerned adult groups' use of the internet over time; therefore, this gap in the literature is addressed.

In the past decade, despite the increased research interest in PIU among youth, a slight decrease has been observed in some countries when investigating the developmental trajectories of PIU, focused on adolescent population. The understanding of these trajectories informs theory development in psychopathology course and clinical judgments regarding risk and prognosis (O'Connor et al., 2020). Longitudinal PIU research has relied on self-screening tools (Anderson et al., 2017), such as the Compulsive Internet Use Scale (CIUS) (Meerkerk et al., 2009), which operationalize PIU as follows: (i) they consider PIU to be on a continuum with varying degrees of symptomology, (ii) they assume PIU impacts the individuals and their context, (iii) they all apply Likert-scales to the items, and (iv) they tend to be used on community samples. The present study used a short form of the CIUS because it has been cross-nationally validated (Lopez-Fernandez et al., 2019) to address the gap regarding the lack of longitudinal research comprising European cross-country sample of adults.

A Spanish longitudinal study (Carbonell et al., 2018) with four waves between 2006-2017, reported an initial increase in PIU among emerging adults between the two first waves (2006-2013), which were followed by a decrease between waves two and three (2013-2015). and no increase between waves three and four (2015-2017). Other similar Asiatic longitudinal studies performed with adolescent populations reported a decrease rate of PIU over time (Choi et al., 2019; Li et al., 2019; Yu & Sheck, 2013), even with no effect regarding the type of internet user (i.e., high-risk vs. low-risk users) (Choi et al., 2019; Li et al., 2019). It is important to test the stability or fluctuation of PIU because there is little empirical evidence regarding the natural trajectory of PIU (Lau et al., 2017), especially in adult population.

A one-year follow up study examining spontaneous remission of PIU among German adolescents showed that efficient emotion regulation was a predictor of decreasing PIU (Wartberg & Lindenberg, 2020). However, to date, no longitudinal study has addressed the natural trajectory of PIU among adults, except for one study that examined the trajectory of problematic online gaming (King et al., 2013). This three-wave study examined an 18-month trajectory among Australian adult regular online gamers and found problem and non-problem users' groups experienced a significant decline in problem online gaming. Similarly, the present study examined whether PIU would remain stable or fluctuate over a one-year period to address the gap on empirical evidence associated with the natural trajectory of PIU.

In light of the aforementioned literature, the primary aim of the present study was to longitudinally examine PIU in a sample of European countries across three waves to investigate the natural course and trajectory of PIU in relation to risky and non-risky internet use across each wave.

Method

Participants

The present study comprised a convenience sample with similar characteristics from 11 European countries (Finland, Germany, Italy, Spain, France, Switzerland, Hungary, Poland, UK, Norway, Belgium) to study PIU in Europe (Lopez-Fernandez et al., 2023). The countries selected were part of Tech Use Disorders Marie Curie project, which among other aims was to longitudinally examine the trajectory of PIU over a one-year period. The Catholic University of Louvain (UCLouvain) in Belgium was the coordinating center. The total sample of this follow-up comprised 139 participants (45.5% females) with an average age of 26.14 years (SD = 5.92), which are those who provided data across all three waves.

Procedure

Therefore, the longitudinal study comprised three waves (i.e., one every six months). Data were collected from February to May 2015 in the first wave, with baseline evaluations

performed in all countries. The subsequent data collections for the following two waves were only performed at six-month and 12-month follow-ups (i.e., the data for second wave were collected from September to December 2015, and the data for the third wave were collected from February to May 2016). Participants were recruited mainly from academic environments through an online survey adapted to the country languages studied in which the descriptive cross-cultural sociodemographic and usage patterns were published elsewhere (Lopez-Fernandez et al., 2023). The method of recruitment consisted inviting students and staff from universities (through university networks both online and offline) as well inviting other adults (e.g., though QR codes disseminated by social networks). Data collection was carried out by academics with expertise in the PIU research field, and who participated in the multilingual adaptation of the German Short CIUS with five items (Besser et al., 2017), namely CIUS-5 (Lopez-Fernandez et al., 2019).

Ethical approval was obtained from the ethics committee of the Psychological Sciences Research Institute at UCLouvain validated by the European Commission. There was a consent form in the first webpage in which a code was created by the participant following the instructions (Lopez-Fernandez et al., 2022), plus an email was requested to invite to the follow-up surveys. Anonymity and confidentiality were provided to participants in the longitudinal study.

Measures

The online survey was administered using *Qualtrics* software, which included questions concerning sociodemographic information, online activities, and PIU, among other instruments not included in the present study. For more detailed information see the previously published papers of the TUD project (Lopez-Fernandez et al., 2019, 2022, 2023).

PIU was assessed using a short version of the CIUS with five items (CIUS-5; Besser et al., 2017, translated and psychometrically adapted with measurement invariance by Lopez-Fernandez et al., 2019), known as the short CIUS. It uses five items of the original 14-item CIUS (Meerkerk et al., 2009). The CIUS-5 is rated on a five-point Likert scale (i.e., from 0 '*never*' to 4 '*very often*') and the overall score ranges from 0 to 20, with higher scores indicating greater severity of PIU. Regarding the cut-off score, those who scored higher than or equal to 15 were considered as at-risk of PIU (i.e., which corresponds to scoring at least 3 ['*often*'] on each item). The original cut-off score proposed by Besser et al. was 7 out of 20 (Besser et al., 2017), which performed best for case detection and yielded a sensitivity of 0.95 and a specificity of 0.87 in a German sample. However, based on previous cross-cultural studies with the short versions of the CIUS (Lopez-Fernandez et al., 2019, 2023) a higher cut-off score from European cross-cultural samples constitutes a more conservative cut-off score to estimate potential at-risk users versus those who were defined as healthy users. The CIUS-5 has good validity and reliability (e.g., Cronbach's alphas [α] = 0.77; Besser et al., 2017). In the present study, the Cronbach alphas were adequate in all three waves (Wave 1: α = 0.74; Wave 2: α = 0.77; Wave 3: α = 0.76).

Statistical analyses

In Wave 1, descriptive analyses (i.e., means [*M*] and standard deviations [*SD*] for continuous variables, and the proportions [*N*] and percentages [*%*] for categorical variables) were computed for the sample to determine sociodemographic characteristics and the prevalence of PIU. To test the reliability of the CIUS-5 in each wave, Cronbach alpha coefficients were calculated. To carry out item analysis of the CIUS-5 in each wave (descriptives, and factor loadings), individual exploratory factor analyses (EFAs) for each wave were carried out to test the unidimensional model using the principal components technique, with the Kaiser-Mayer-Olkin index (KMO) and Bartlett's test of sphericity to confirm the adequacy of the sample and procedure respectively. The analysis yielded one factor with eigenvalues above 1 (factor loading>0.6) which was acceptable based on its explained variance. Regarding the three waves, the natural course and trajectory of PIU was investigated for both potential 'at risk' and 'healthy' internet users across all three waves using the conservative approach from the cut-off scores (15 out of 20; Lopez-Fernandez et al., 2019). To examine the trajectories, a one-way analysis of variance (ANOVAs) for a factor (CIUS-5 with each cut-off score) was performed to estimate the main effects of each wave on CIUS-5 scores longitudinally. IBM SPSS 21 software was used for all the analyses.

Results

Sociodemographics and the Problematic Internet Use

From the 139 users in the three Waves, the CIUS-5 average scores slightly decreased at each time point (Wave 1: M = 6.50, SD = 3.84; Wave 2: M = 5.73, SD = 3.27, Wave 3: M = 5.65, SD = 3.26*)*. The associastion between age and each of the wave scores showed significant inverse relationships between age and the CIUS-5 score in each wave (r_{wave1} = - 0.27, p = 0.002; r_{wave2} = - 0.24, p = 0.004; r_{wave3} = - 0.19, p = 0.023). However, when comparing the gender and each of the wave scores, none of the results were significant, meaning there was no gender effect concerning CIUS-5 results in the study (Wave 1: t_{137} = - 0.37, p = 0.716; Wave 2: t_{137} = 0.12, p = 0.902; Wave 3: t_{137} = 4.22, p = 0.674).

Item analysis of the CIUS-5 in the three waves

Table 1 shows the item analysis of each of the five items in the short CIUS within each Wave. The factor validity of the Wave 1 with EFA (KMO=0.77; Bartlett's test: χ^2 (10)=139.99; p < 0.001) yielded one factor with eigenvalues

Table 1
Item analysis (item number, item statement, mean, standard deviation, factor load) by each Wave

Item	CIUS-5 Statement	M (SD), FL Wave 1	M (SD), FL Wave 2	M (SD), FL Wave 3
1	Do you find it difficult to stop using the Internet when you are online?	1.73 (1.15), 0.77	1.50 (0.91), 0.75	1.49(0.90), 0.78
2	Do others (e.g., partner, children, and parents) say you should use the Internet less?	0.78 (1.08), 0.64	0.62 (0.75), 0.72	0.59 (0.84), 0.64
3	Are you short of sleep because of the Internet	1.12 (1.12), 0.77	1.04 (0.95), 0.72	0.99 (0.97), 0.75
4	Do you neglect your daily obligations (work, school, or family life) because you prefer to go on the Internet?'	0.90(1.04), 0.69	0.67(0.88), 0.78	0.71(0.88), 0.73
5	Do you go on the Internet when you are feeling down	1.97 (1.09), 0.63	1.90 (1.01), 0.67	1.86 (0.99), 0.65

Note. Instructions were "How often..."; M=mean, SD= standard deviation, FL= factor load; ***p<0.001, all are standardized loadings.

above 1 and factor loadings greater than 0.6 (see Table 1). The PIU factor among European adults explained 49.45% of the total variance. This was similar in both Wave 2 (KMO=0.83; Bartlett's test: χ^2 (10)=162.09; $p < 0.001$; variance 53.15%), and Wave 3 (KMO=0.80; Bartlett's test: χ^2 (10)=147.09; $p < 0.001$; variance 50.86).

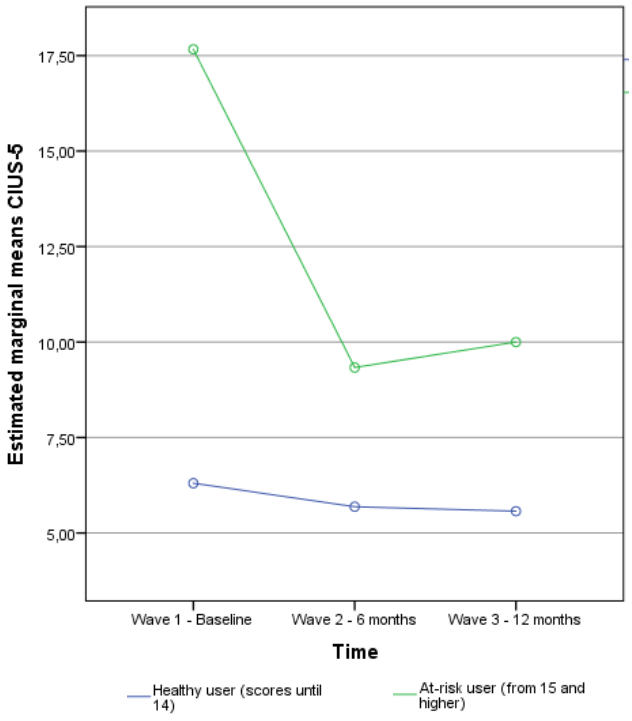
It can be observed that the symptoms with higher average scores were Item 5 and Item 1 which refer to the symptomatology concerning mood modification and loss of control, respectively. The symptoms concerning more severe addiction symptomatology, such as Item 2 and Item 4 (conflict withs other areas of the individual's life [i.e., functional impairment]) had lower scores. One symptom associated with general psychopathology appeared to have a moderately low presence (i.e., sleeps problems associated to internet use).

Prevalence

Applying the conservative approach to determinate probable risk of PIU (Lopez-Fernandez et al., 2023), there was a clear higher CIUS-5 scores only in Wave 1 (M_{Wave1} = 17.67, SD = 2.08, M_{Wave2} = 9.33, SD = 8.50, and M_{Wave3} = 10.00, SD = 3.61), whereas healthy users had lower CIUS-5 scores. The pattern offers clarity regarding those with a higher potential risk of PIU, who were different from those who had no PIU, and who remained highly comparable across all three waves (M_{Wave1} = 6.30, SD = 3.46, M_{Wave2} = 5.69, SD = 3.08, and M_{Wave3} = 5.57, SD = 3.20). Indeed, observing Figure 1, a considerable number of at-risk users in Wave 1 were no longer at-risk at Waves 2 and Wave 3 apart from a slight increase in the third wave but this was not significant between the last two waves among this problematic group. In fact, they became 'healthy' users (i.e., scores under 15 on the CIUS-5).

In Figure 1, the findings of the second ANOVA showed a longitudinal effect of waves on the CIUS-5 (Greenhouse-Geisser $F_{(1.69, 229.85)}$ = 14.56, $p < 0.001$, η^2 = .10). Mauchly's test indicated the assumption of sphericity was also violated, (χ^2 = 27.35, $p < 0.001$), therefore multivariate tests were utilized (ε = 0.85). Time (i.e., the three waves) and type of user (i.e., healthy vs. at-risk users) significantly affected PIU, with those classed as at-risk having higher scores than healthy users, especially in Wave 1 (V = 0.14, $F_{(2, 135)}$ = 10.55, $p < 0.001$, η^2 = .14). These findings suggest the CIUS-5 scores were not stable over time, especially between Wave 1 and Wave 2 (M difference = 4.47, $p < 0.001$) and Wave 1 and Wave 3 (M difference = 4.20, $p < 0.001$) because there were no significant differences between Waves 2 and 3 (M difference = -0.27, p = 1.000). Therefore, the results indicate that PIU decreased over time in the present study.

Figure 1
Mean trajectories of problem internet use symptoms assessed with CIUS-5 for at-risk vs. healthy users according to Lopez-Fernandez et al.'s cut-off point in three waves every six months



Discussion

The aim of the present study was to investigate PIU longitudinally by analyzing a sample extracted from 11 European countries included in the TUD project and to investigate the natural course and trajectory of PIU in relation at-risk and healthy internet use across one-year period in an adult population and addressing several gaps in the literature, a population groups with scarce follow-up studies.

The present study is noteworthy in that it provides a longitudinal analysis of PIU among adults. More specifically, the study defines PIU as the compulsive use of various online applications. This level of detail helps to clarify and deepen the understanding of this complex phenomenon (Anderson et al., 2017). The present study utilized a brief version of the original CIUS (Meerkerk et al., 2009), the short CIUS (Besser et al., 2017), in its cross-cultural adaptations (Lopez-Fernandez et al., 2019). The sample was mainly young and middle-aged adults, as although the average age was 26 years, the range was 38 years across the whole sample. According to a recent meta-analysis on internet addiction between 2017-2020 (Lozano-Blasco et al., 2022), the mean age was 23.55 years old, which means that the present study's mean age is higher than recent studies. Moreover, the inverse association found between the age and PIU is a typical finding in the field and highlights the fact that younger users tend to have greater PIU. However, when considering gender issues, although the sample was imbalanced, it did not produce any significant differences regarding the PIU measure, which may be due to the age groups and the fact that generalized PIU was studied rather than specific PIU (Davis, 2001), such as online gaming or social media use.

With regard to the findings derived from the analysis of the CIUS-5 items, it is noteworthy that the main addictive symptomatology was mood modification and loss of control, which in the case of mood modification is one of the less severe addiction symptoms. Loss of control has been debated in the literature. For instance, Griffiths (2013) has argued that loss of control is not always present in behavioral addictions although he does mention loss of control under the core component of conflict. Moreover, those items associated with functional impairment had lower scores on the CIUS, which supports the notion that the short CIUS assesses more the compulsive aspects of PIU rather than the addictive aspects of it. It opens the debate whether PIU assessed with the CIUS-5 can be considered a medical disorder (Telles Correira et al., 2022). The construct (Anderson et al., 2017) clearly has a psychosocial component of distress and disability regarding a generalized online usage pattern of devices, but the biological component is not yet clear. However, sleep problems emerged as a moderate symptom which much of the literature has shown to be associated with PIU (Aboujaoude, 2010), although usually more often related to adolescent populations (Kokka et al., 2021).

Prevalence of PIU in the present study was estimated during a one-year period of study on three different occasions. The use of present authors' conservative approach (Lopez-Fernandez et al., 2023) was probably more accurate in estimating the true proportion of those at risk of PIU given the significantly lower prevalence estimates. In relation to the longitudinal aspect of the present study, the prevalence estimation method showed that the same users tended to decrease their online use even at the six-month follow-up (Wave 2). The findings indicated that PIU symptoms (i.e., lack of control, sleep disturbance, neglecting obligations, feeling sad, and mood modification) fluctuated over time for both at-risk and healthy internet users. These findings suggest a natural decrease of PIU over time, even possible natural recovery of the PIU among adults.

Despite the many prevalence studies assessing PIU, there is still limited understanding of the natural recovery process without interventions or factors which may predict the healing process (Lau et al., 2017). However, recent studies have shown a reduction in addictive symptoms, indicating low temporal symptom stability and high spontaneous remission rates over a year (Lindenberg et al., 2022; Wartberg & Lindenberg, 2020). It is worth noting that this could be a regression to the mean effect or an increased awareness of the problem (Rothmund et al., 2018), especially among adult users in the present study. Indeed, only one study has examined spontaneous remission and its causes longitudinally, reporting that higher self-efficacy, lower levels of maladaptive emotion regulation strategies, lower depression and anxiety, and lower procrastination could be promising protective factors (Wartberg & Lindenberg, 2020).

More importantly, being at-risk PIU was generally low and tended to change over time in a positive way because PIU significantly decreased after six months and the tendency was maintained in the following six months (i.e., a year after initial data collection). This suggests there may be a decrease of PIU over time across countries, not only in adolescent populations (O'Connor et al., 2020; Yu & Shek, 2013), but also among adults (i.e., a score of less than 15 on the CIUS-5 being considered as not at-risk Lopez-Fernandez et al., 2023). These findings are similar to other longitudinal studies regarding the progressively lower scores for PIU over time (Carbonell et al., 2009, 2016, 2018; Choi et al., 2019, Li et al., 2019, Yu & Shek, 2013). The observed decline in PIU over the course of a year may be because of various internal and external protective factors. With regards to the internal factors, the majority of users were young and middle-aged adults with a higher level of education and, as an adult population, they may have possibly developed coping skills over the course of a year (Kalaitzaki et al., 2022), or demonstrated positive psychological attributes, such as happiness, resilience, hope,

self-control, and self-management skills (Hidalgo-Fuentes et al., 2023; Yilmaz & Yilmaz, 2023). With regards to the external factors, a stable family environment and supportive surroundings, may have contributed to the decrease. These findings suggest that protective factors may play a crucial role in mitigating PIU.

The limitations of the present study include non-probabilistic samples collected through online snowball sampling and the data being based on self-report (Lopez-Fernandez et al., 2023). Furthermore, due to the attrition rate, only those who completed the survey across all three waves were longitudinally analyzed resulting in a small sample size (3.51% of the total initial sample). For this reason, cross-country comparison was not possible. Also, the data were collected in 2015-2016, but there are few longitudinal studies among this age group in Europe. These elements influence the generalizability of the current findings. However, internal validity has been ensured based on the measure used (CIUS-5 cross-country validated; Lopez-Fernandez et al., 2019), and the follow-up of the same participants during three waves in one year, which is a strength of the present longitudinal study not achieved for all previous similar studies (Choi et al., 2019; Li et al., 2019). It is important to note that the data were collected prior to the onset of the COVID-19 pandemic, necessitating some degree of caution when interpreting the findings. Of particular note is the fact that, to the best of authors' knowledge, no longitudinal study examining PIU has been published with adult populations. Given the ongoing relevance of this issue, further research is warranted to better understand the long-term implications of PIU among adults.

Although PIU is present in industrialized societies, it appears that as people get older, PIU diminishes. However, a small proportion of users still have a problem and that it is primarily related to mood swings, loss of control and sleep problems, regardless of gender. The present study provides evidence that PIU is longitudinally associated with distress, dysfunction, and consequences such as sleep problems which appear to be useful from a diagnostic standpoint (Kokka et al., 2021). It appears important to continue providing follow-up studies with adult populations, and even older ones, if possible, as current problem users are growing in age. It seems that PIU (even though it diminishes as individuals get older) can still remain a longer-term problem for a minority of adults. Regarding PIU in both general and specific forms, there is also need for longitudinal studies among specific forms (e.g., social media use, online gambling, online shopping, etc.). Moreover, more individual and contextual information is likely to offer more accurately reflect the kinds of factors related to (and associated with) the use of current online technologies, such as drug use, academic/labor factor, and psychosocial problems (Secades-Villa et al., 2014).

In conclusion, the present study addresses a number of research gaps regarding the need for longitudinal studies examining PIU among adult populations with validated scales for cross-cultural comparisons. To date, no previous longitudinal study including adults in a European sample has been conducted exploring the trajectory of PIU comparing those screened as potentially at-risk of PIU with online healthy users. More importantly, it appears self-reported risk for PIU was generally low across the samples and positively changed (i.e., PIU decreased across the course of the three waves at six months of follow up) demonstrating potential remission or natural recovery. However, caution must be taken due to the small sample size of those who provided data across all three study waves.

Author contributions

The first author, Olatz Lopez-Fernandez was the principal investigator, who developed the study concept and design, performed the statistical analysis and initial interpretation of the data, oversaw the project, and wrote the first draft. Daria J. Kuss, and Mark D. Griffiths, reviewed the manuscript, adding comments and suggestions, and oversaw from the second to final drafts. All co-authors contributed to adapting the short version of the survey in their languages, collecting data in their respective countries, and revising the subsequent versions until the final write-up of the manuscript supervised by Olatz Lopez-Fernandez and Mark D. Griffiths. All authors have read and agreed to the published version of the manuscript.

Funding

This research was funded by the European Commission, grant title: Technological use disorders: European cross-cultural longitudinal and experimental studies for Internet and smartphone problem uses project; code: FP7-PEOPLE-2013-IEF-627999. It was also supported by the Hungarian National Research, Development and Innovation Office (KKP126835).

Acknowledgments

Tech Use Disorders (FP7-PEOPLE-627999) awarded to Olatz Lopez-Fernandez. It is acknowledged those who contributed to the Tech Use Disorders project as supervisor (Joël Billieux) and co-investigators (Halley Pontes, Adriano Schimmenti, Alessia Passanisi, Laurence Kern, Yannick Morvan, Hans-Jürgen Rumpf, Anja Bischof, Orsolya Király, Pierluigi Graziani, Maria Kääriäinen, Nils Inge Landrø, Juan José Zacarés, Emilia Serra, Mariano Chóliz, Lucien Rochat, and Daniele Zullino).

Conflicts of interest

The authors declare no conflict of interest except Mark D. Griffiths, who has received research funding from *Norsk Tipping* (the gambling operator owned by the Norwegian government). He has also received funding for a number of research projects in the area of gambling education for young people, social responsibility in gambling, and gambling treatment from Gamble Aware (formerly the Responsibility in Gambling Trust), a charitable body which funds its research program based on donations from the gambling industry. He undertakes consultancies for various gambling companies in the area of social responsibility in gambling.

References

Aboujaoude, E. (2010). Problematic Internet use: An overview. *World Psychiatry, 9*(2), 85–90. https://doi.org/10.1002/j.2051-5545.2010.tb00278.x

Anderson, K. J. (2001). Internet use among college students: An exploratory study. *Journal of American College Health*, *50*(1), 21–26. https://doi.org/10.1080/07448480109595707

Anderson, E. L., Steen, E. & Stavropoulos, V. (2017). Internet use and problematic internet use: A systematic review of longitudinal research trends in adolescence and emergent adulthood. *International Journal of Adolescence and Youth*, *22*(4), 430–454. https://doi.org/10.1080/02673843.2016.1227716

Besser, B., Rumpf, H. J., Bischof, A., Meerkerk, G. J., Higuchi, S. & Bischof, G. (2017). Internet-related disorders: Development of the Short Compulsive Internet Use Scale. *Cyberpsychology, Behavior and Social Networking*, *20*(11), 709–717. https://doi.org/10.1089/cyber.2017.0260

Carbonell, X., Chamarro, A., Oberst, U., Rodrigo, B. & Prades, M. (2018). Problematic use of the internet and smartphones in university students: 2006-2017. *International Journal of Environmental Research and Public Health*, *15*(3), 475. https://doi.org/10.3390/ijerph15030475

Carbonell, X., Guardiola, E., Beranuy, M. & Bellés, A. (2009). A bibliometric analysis of the scientific literature on internet, video games, and cell phone addiction. *Journal of the Medical Library Association*, *97*(2), 102–107. https://doi.org/10.3163/1536-5050.97.2.006

Carbonell, X., Guardiola, E., Fuster, H., Gil, F. & Panova, T. (2016). Trends in scientific literature on addiction to the internet, video games, and cell phones from 2006 to 2010. *International Journal of Preventive Medicine*, *7*, 63. https://doi.org/10.4103/2008-7802.179511

Choi, B. Y., Huh, S., Kim, D. J., Suh, S. W., Lee, S. K. & Potenza, M. N. (2019). Transitions in problematic internet use: A one-year longitudinal study of boys. *Psychiatry Investigation*, *16*(6), 433–442. https://doi.org/10.30773/pi.2019.04.02.1

Davis, R. A. (2001). Cognitive-behavioral model of pathological Internet use. *Computers in Human Behavior, 17*(2), 187–195. https://doi.org/10.1016/S0747-5632(00)00041-8

Hidalgo-Fuentes, S., Martí-Vilar, M. & Ruiz-Ordoñez, Y. (2023). Problematic internet use and resilience: A systematic review and meta-analysis. *Nursing Reports*, *13*(1), 337–350. https://doi.org/10.3390/nursrep13010032

Griffiths, M. D. (2013). Is "loss of control" always a consequence of addiction? *Frontiers in Psychiatry*, *4*, 36. https://doi.org/10.3389/fpsyt.2013.00036

Kalaitzaki, A., Laconi, S. & Tsouvelas, G. (2022). Problematic internet, smartphone, and SMS use among adults: Shared and unique predictors. *Journal of Research in Health Sciences*, *22*(4), e00562. https://doi.org/10.34172/jrhs.2022.97

King, D. L., Delfabbro, P. H. & Griffiths, M. D. (2013). Trajectories of problem video gaming among adult regular gamers: An 18-month longitudinal study. *Cyberpsychology, Behavior and Social Networking*, *16*(1), 72–76. https://doi.org/10.1089/cyber.2012.0062

Kokka, I., Mourikis, I., Nicolaides, N. C., Darviri, C., Chrousos, G. P., Kanaka-Gantenbein, C. & Bacopoulou, F. (2021). Exploring the effects of Problematic Internet Use on adolescent sleep: A systematic review. *International Journal of Environmental Research and Public Health*, *18*(2), 760. https://doi.org/10.3390/ijerph18020760

Lau, J. T. F., Wu, A. M. S., Gross, D. L., Cheng, K. M. & Lau, M. M. C. (2017). Is Internet addiction transitory or persistent? Incidence and prospective predictors of remission of internet addiction among Chinese secondary school students. *Addictive Behaviors*, *74*, 55–62. https://doi.org/10.1016/j.addbeh.2017.05.034

Li, G., Hou, G., Yang, D., Jian, H. & Wang, W. (2019). Relationship between anxiety, depression, sex, obesity, and internet addiction in Chinese adolescents: A short-term longitudinal study. *Addictive Behaviors*, *90*, 421–427. https://doi.org/10.1016/j.addbeh.2018.12.009

Lindenberg, K., Kindt, S. & Szász-Janocha, C. (2022). Effectiveness of cognitive behavioral therapy-based intervention in preventing gaming disorder and unspecified internet use disorder in adolescents: A cluster randomized clinical trial. *JAMA Network Open*, *5*(2), e2148995. https://doi.org/10.1001/jamanetworkopen.2021.48995

Lopez-Fernandez, O. (2015). How has internet addiction research evolved since the advent of internet gaming disorder? An overview of cyberaddictions from a psychological perspective. *Current Addiction Reports, 2,* 263–271. https://doi.org/10.1007/s40429-015-0067-6

Lopez-Fernandez, O., Griffiths, M. D., Kuss, D. J., Dawes, C., Pontes, H. M., Justice, L., Rumpf, H. J., Bischof, A., Gässler, A. K., Suryani, E., Männikkö, N., Kääriänen, M., Romo, L., Morvan, Y., Kern, L., Graziani, P., Rousseau, A., Hormes, J. M., Schimmenti, A., Passanisi, A.,… Billieux, J. (2019). Cross-cultural validation of

the Compulsive Internet Use Scale in four forms and eight languages. *Cyberpsychology, Behavior and Social Networking*, *22*(7), 451–464. https://doi.org/10.1089/cyber.2018.0731

Lopez-Fernandez, O., Romo, L., Kern, L., Rousseau, A., Graziani, P., Rochat, L., Achab, S., Zullino, D., Landrø, N. I., Zacarés, J. J., Serra, E., Chóliz, M., Pontes, H. M., Griffiths, M. D. & Kuss, D. J. (2022). Perceptions underlying addictive technology use patterns: Insights for cognitive-behavioural therapy. *International Journal of Environmental Research and Public Health*, *19*(1), 544. https://doi.org/10.3390/ijerph19010544

Lopez-Fernandez, O., Romo, L., Kern, L., Rousseau, A., Lelonek-Kuleta, B., Chwaszcz, J., Männikkö, N., Rumpf, H. J., Bischof, A., Király, O., Gässler, A. K., Graziani, P., Kääriäinen, M., Landrø, N. I., Zacarés, J. J., Chóliz, M., Dufour, M., Rochat, L., Zullino, D., Achab, S.,… Kuss, D. J. (2023). Problematic internet use among adults: A cross-cultural study in 15 countries. *Journal of Clinical Medicine*, *12*(3), 1027. https://doi.org/10.3390/jcm12031027

Lozano-Blasco, R., Robres, A. Q. & Sánchez, A. S. (2022). Internet addiction in young adults: A meta-analysis and systematic review. *Computers in Human Behavior*, 107201. https://doi.org/10.1016/j.chb.2022.107201

Meerkerk, G. J., Van Den Eijnden, R. J., Vermulst, A. A. & Garretsen, H. F. (2009). The Compulsive Internet Use Scale (CIUS): Some psychometric properties. *CyberPsychology & Behavior, 12*(1), 1–6. https://doi.org/10.1089/cpb.2008.0181

O'Connor, C., Downs, J., Shetty, H. & McNicholas, F. (2020). Diagnostic trajectories in child and adolescent mental health services: Exploring the prevalence and patterns of diagnostic adjustments in an electronic mental health case register. *European Child & Adolescent Psychiatry*, *29*(8), 1111–1123. https://doi.org/10.1007/s00787-019-01428-z

Pontes, H. M., Szabo, A. & Griffiths, M. D. (2015). The impact of Internet-based specific activities on the perceptions of Internet addiction, quality of life, and excessive usage: A cross-sectional study. *Addictive Behaviors Reports*, *1*, 19–25. https://doi.org/10.1016/j.abrep.2015.03.002

Rothmund, T., Klimmt, C. & Gollwitzer, M. (2018). Low temporal stability of excessive video game use in German adolescents. *Journal of Media Psychology: Theories, Methods, and Applications, 30*(2), 53–65. https://doi.org/10.1027/1864-1105/a000177

Secades-Villa, R., Calafat, A., Fernández-Hermida, J. R., Juan, M., Duch, M., Skärstrand, E., Becoña, E. & Talic, S. (2014). Duration of Internet use and adverse psychosocial effects among European adolescents. *Adicciones*, *26*(3), 247–253. https://doi.org/10.20882/adicciones.6

Sixto-Costoya, A., Castelló-Cogollos, L., Aleixandre-Benavent, R. & Valderrama-Zurián, J. C. (2021). Global scientific production regarding behavioral addictions: An analysis of the literature from 1995 to 2019. *Addictive Behaviors Reports*, *14*, 100371. https://doi.org/10.1016/j.abrep.2021.100371

Telles Correia, D., Stoyanov, D. & Rocha Neto, H. G. (2022). How to define today a medical disorder? Biological and psychosocial disadvantages as the paramount criteria. *Journal of Evaluation in Clinical Practice*, *28*(6), 1195–1204. https://doi.org/10.1111/jep.13592

Tran, B. X., Ha, G. H., Vu, G. T., Hoang, C. L., Nguyen, S. H., Nguyen, C. T., Latkin, C. A., Tam, W. W., Ho, C. S. H. & Ho, R. C. M. (2020). How have excessive electronics devices and internet uses been concerned? Implications for global research agenda from a bibliometric analysis. *Journal of Behavioral Addictions*, *9*(2), 469–482. https://doi.org/10.1556/2006.2020.00031

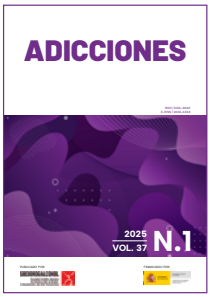
Wartberg, L. & Lindenberg, K. (2020). Predictors of spontaneous remission of problematic internet use in adolescence: A one-year follow-up study. *International Journal of Environmental Research and Public Health*, *17*(2), 448. https://doi.org/10.3390/ijerph17020448

Yilmaz, R. & Karaoglan Yilmaz, F. G. (2023). Problematic internet use in adults: The role of happiness, psychological resilience, dispositional hope, and self-control and self-management. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 41*, 727–745. https://doi.org/10.1007/s10942-022-00482-y

Yu, L. & Shek, D. T. (2013). Internet addiction in Hong Kong adolescents: A three-year longitudinal study. *Journal of Pediatric and Adolescent Gynecology*, *26*(3 Suppl), S10–S17. https://doi.org/10.1016/j.jpag.2013.03.010

SOCIDROGALCOHOL
Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías

ADICCIONES
2025 ■ VOL. 37 ■ N. 1 ■ PAGES 61–72
www.adicciones.es



ORIGINAL

Factors associated with video game abuse among adolescent women

Factores asociados al abuso de videojuegos en mujeres adolescentes

Mónica Bernaldo-de-Quirós*; Lucía Herrera*; Iván Sánchez-Iglesias**; Ignacio Fernández-Arias*; Francisco Estupiñá*; Marta Labrador*; Marina Vallejo-Achón*; Francisco J. Labrador*.

* Departamento de Personalidad, Evaluación y Psicología Clínica. Facultad de Psicología. Universidad Complutense de Madrid.

** Departamento de Psicobiología y Metodología en Ciencias del Comportamiento. Facultad de Psicología. Universidad Complutense de Madrid.

Abstract

Playing video games can become a problem behavior. The factors associated with this transition have been widely studied in males, while among females it is a field that has not yet been sufficiently addressed. The objective of this study was to determine the prevalence of problematic video game use in adolescent females and the associated risk factors. Specifically, to analyze the predictive potential of videogaming habits, psychopathological symptomatology and maladaptive gaming cognitions. A sample of 536 females (12-17 years old) (*M*= 13.91; *SD*= 1.57) was obtained by stratified random sampling from educational centers in the Community of Madrid, to whom the *Gamertest*, an online expert system to assess problematic video game use, was administered. 2.8% of the adolescent girls had a problematic video game use, and only 0.7% had an Internet Gaming Disorder. The main predictive variables identified were: cognitions related to compulsion and preoccupation, average number of gaming days per week and anxious symptomatology. The results obtained are in addition to the few studies carried out in women and highlight the need to pay special attention to the maladaptive gaming cognitions in the prevention and treatment of these problems.

Keywords: video games, Internet Gaming Disorder, risk factors, females, adolescent

Resumen

Jugar a videojuegos puede convertirse en una conducta problemática. Los factores asociados a esta transición han sido ampliamente estudiados en varones, mientras que entre las mujeres es un campo aún no suficientemente abordado. El objetivo de este trabajo fue identificar qué factores de riesgo pueden estar asociados al uso problemático de videojuegos en mujeres adolescentes. En concreto, analizar el potencial predictivo de los hábitos de juego, la sintomatología psicopatológica y las cogniciones desadaptativas relacionadas con los videojuegos. Mediante muestreo aleatorio estratificado de los centros educativos de la Comunidad de Madrid se obtuvo una muestra de 536 mujeres (12-17 años) (*M*= 13,91; *DT*= 1,57), a las que se aplicó el *Gamertest*, un sistema experto *online* para evaluar el uso problemático de videojuegos. Un 2,8% de las adolescentes presentaban un uso problemático de videojuegos, y tan sólo un 0,7% un Trastorno por Juego en Internet. Las principales variables predictoras identificadas fueron: las cogniciones relacionadas con compulsión y preocupación, el promedio de días de juego a la semana y la sintomatología ansiosa. Los resultados obtenidos se suman a los escasos estudios realizados en mujeres y ponen de manifiesto la necesidad de prestar atención, especialmente, a las cogniciones desadaptativas relacionadas con los videojuegos en la prevención y tratamiento de estos problemas.

Palabras clave: videojuegos, Trastorno de Juego en Internet, factores de riesgo, mujeres, adolescentes

■ *Received: June 2023; Accepted: January 2024.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Mónica Bernaldo-de-Quirós. Facultad de Psicología. Universidad Complutense de Madrid. Campus de Somosaguas s/n. 28223-Madrid.
Email: mbquiros@psi.ucm.es

Playing video games (PVG) has become an increasingly popular leisure activity, especially among teenagers. Its rapid increase has been facilitated by the availability of an ever-growing variety of more attractive video games (VG), by their greater accessibility from different devices, as well as by widespread social acceptance. The survey by the Spanish Video Game Association (AEVI, 2021) shows that 18.1 million Spaniards spent an average of eight hours a week during 2021 playing video games. Of these, 74% were aged between 15 and 24 years. According to the latest ESTUDES survey (on drug use in Spanish secondary schools), 70% of students who have played VG have done so without spending money on improving their skills or game characters, although 20.1% acknowledge having spent €50, 5% between €50 and €100, and 4.4% more than €100 on such enhancements (Observatorio Español de las Drogas y las Adicciones [OEDA], 2023). The majority of players use VG responsibly, but more and more studies report that an inappropriate pattern of PVG is becoming apparent in a certain percentage of players (Paulus et al., 2018). This has generated considerable social alarm, since it has been confirmed that inappropriate or problematic use of PVG affects adolescents in particular (Mihara & Higuchi, 2017). In addition to the danger of problematic VG use itself, it has been associated in numerous studies with the presence of psychopathological, family and social problems. This is reflected in the inclusion of Internet Gaming Disorder (IGD) in DSM-5 (APA, 2013), as a research category in Section III. The WHO has likewise included Gaming Disorder (GD) in the eleventh revision of the International Classification of Diseases (ICD-11) (OMS, 2018).

How do women play?

It is a fact that the percentage of men is higher than that of women among the video gamer community (AEVI, 2021; Entertainment Software Association [ESA], 2022), but it is also true that the number of women participating in this hobby is rising (OEDA, 2022). Surveys show that, both in the Spanish population (AEVI, 2021) and in the American population (ESA, 2022), almost half (48%) of video gamers of all ages are women. Moreover, among adolescents, 73% of Spaniards who played video games during 2021 were women; 4% more than in 2019 (OEDA, 2022).

A more careful look at the habits of women when playing video games reveals that there are differences with respect to men in terms of playing time, preferred game genre, and the device preferred for playing. Firstly, gaming in women is characterized by sporadic and short periods of gaming, in contrast to men. According to various studies on adolescents, women not only play on fewer days per week, but also for fewer hours per day than their male counterparts (Fumero et al., 2020; Gómez-Gonzalvo et al., 2020; Leonhardt & Overå, 2021; OEDA, 2022). Furthermore, population studies have shown that the video game genres chosen by women tend to be different from those chosen by adolescent men (Gómez-Gonzalvo et al., 2020; Leonhardt & Overå, 2021; López-Fernández et al., 2021). Women tend to prefer cooperative games over competitive games, and social, card, puzzle, educational or skill games are preferred over role-playing, action, fighting, sports or shooting games (Labrador et al., 2022). Regarding the device used for playing, it seems that adolescent girls use mobile phones more than games consoles (Gómez-Gonzalvo et al., 2020; Ricoy & Ameneiros, 2016).

Problematic video game use among women

Although it is true that problematic video game use is more prevalent among men (Castro-Sánchez et al., 2019; Fumero et al., 2020; Wang et al., 2018; Warburton et al., 2022), the percentage of women who also suffer from it should not be ignored. Thus, results in the meta-analysis by Stevens et al. (2021) on the global prevalence of IGD indicated an average of 2.54% with this pathology were women. The authors themselves concluded that, although lower than for men (6.31%), the rate seems to be increasing, since in 2009 it was 1.75%. Regarding prevalence in Spain, it has been observed that, among students aged 14 to 18 years, 2.7% of those who presented possible IGD were women (OEDA, 2022).

However, less has been published about the factors which raise the risk of such behaviour in this population (López-Fernández et al., 2019; Marraudino et al., 2022). Most studies have been carried out with predominantly male samples or have not taken into account differences and similarities regarding gender. Among the risk factors associated with problematic use are: *age*, although it is true that excessive video gaming is more frequent in adolescence, some studies suggest that in women it is more likely to occur with increasing age (López-Fernández, 2018; Marraudino et al., 2022); *time spent playing* (Fumero et al., 2020); and *game genre*, with *Multiplayer Online Battle Arenas* (MOBA), *First Person Shooters* (FPS) and *Massively Multiplayer Online Role-Playing Games* (MMORPG) the games more likely to lead to more problematic use (López-Fernández et al., 2019).

Furthermore, women report different motivations than men, with the most common being socializing with others, physically or online (McLean & Griffiths, 2013). López-Fernández et al. (2019) found that, among women, it was not only social motivation that acted as a predictor of excessive video game use, but also primarily achievement motivation. In addition, Laconi et al. (2017) found the competition factor to be a predictor, exclusively in women, as well as the escape factor in both sexes. That is to say, playing for the pleasure of beating the other players was found as a predictor only in women, while playing to avoid thinking about real-life problems acted as a predictor in both women and men.

Furthermore, certain pathologies have been shown to be linked to video game abuse. Among them, anxiety and depression show contradictory results, however. In relation to anxiety, Fumero et al. (2020) found results, in a sample of Spanish adolescents, which suggested that anxiety could be a predisposing factor. Meanwhile, Cudo et al. (2022) found the opposite, since they obtained a negative correlation between anxiety and problematic use of video games. Regarding depression, this has been positively associated with abusive use of video games (Bonnaire & Baptista, 2019), and it has been indicated that it could be a predictor of the future development of this problem among women (Marraudino et al., 2022). Nevertheless, in the study by López-Fernández et al. (2019), depression did not emerge as a predictor among gamers in the sample, while other psychopathologies did.

As for the role of maladaptive cognitions, while less studied, they have also been shown to be relevant among women. Yu et al. (2021) confirmed a significant association between adolescent girls and problematic gaming, although this was weaker than among their male peers.

The general objective of the present study was to determine the risk factors for problematic video game use in a sample of adolescent women from the city of Madrid. Specifically, the risk factors assessed were: hours and days per week dedicated to playing, preferred game genre, motivation for playing, psychopathological symptoms and maladaptive cognitions linked to video games. Based on the literature review carried out, it was expected that adolescents with higher scores in problematic video game use: play for more hours and/or days per week; report socializing, feeling of winning and/or getting distracted from problems as motivation for playing; and prefer shooter and/or massively multiplayer online (MMO) games and lower preference for puzzle games. They were also expected to score higher in psychopathological symptoms, specifically anxiety and/or social dysfunction, as well as in maladaptive cognitions related to video games, specifically, preoccupation with the game, self-esteem based on the game and/or compulsion.

Method

Participants

This study is part of a larger project funded by the Spanish Ministry of Economy and Competitiveness. Sample selection was carried out through stratified random sampling of schools in the city of Madrid. To do this, the population of students from the city's 21 districts, their age, school, school year and school type (public, state subsidized or private) were recovered from the statistical services website of the Autonomous Community of Madrid City Council (2017). From there, a stratified random sample was obtained, equating the distribution of students from the different districts, school type and school year from the first year of compulsory secondary education (ESO) to the second year of baccalaureate or vocational training (VT) equivalent. The total sample comprised 2,887 participants, of which 2,173 had played video games.

The inclusion criteria in the present study were: a) being a woman; b) aged between 12 and 17 years; and c) having played video games. Participants who had any condition that could interfere with the assessment process (e.g., cognitive deficit, sensory deficit, etc.) or whose parents or guardians were against their participation in the study were excluded.

Of the 2,173 participants who had played video games, 1,547 male participants were discarded. Of the 626 remaining women participants, 89 between the ages of 18 and 22 were excluded. Finally, one participant was eliminated due to missing data. Thus, the present sample consisted of 536 women, with an average age of 13.91 years (SD = 1.57; max.: 17, min.: 12). Among the adolescents, 438 (81.7%) were in ESO, 79 (14.7%) were studying for the baccalaureate and 19 (3.5%) were in vocational training.

Variables and instruments

This information was collected through the Gamertest (Labrador et al., 2019), an online expert system which detects the problematic use of video games and is available on http://www.gamertest.es/. The assessment protocol is available at osf.io/nrv45. The variables used in the present study are described in more detail below.

Problematic Use of Video Games

The *IGDS9-SF* (Pontes & Griffiths, 2015) was used in its Spanish validation (Sánchez-Iglesias et al., 2020) to assess gaming problems. This is a brief instrument of nine items assessing the nine diagnostic criteria of DSM-5. It measures the severity of IGD and its negative consequences by assessing the gaming activities carried out in the last 12 months, online and offline. It consists of a five-point Likert-type scale ranging from: (1) *never* to (5) *very often*. In its original validation, it showed an internal consistency of 0.87, good criterion validity and good convergent validity with other instruments measuring problematic video games or Internet use. The Spanish validation (Sánchez-Iglesias et al., 2020) indicates an internal consistency of 0.84, and recommends a cut-off point of 36, or meeting five criteria with a score of 5 to signal probable IGD, and a cut-off point of 27 or meeting three criteria with a score of 3 to indicate probable problematic use.

Gaming habits

Weekly hours of gaming (dichotomized into two categories: less than 30 hours per week and 30 hours per week or more), average number of days per week played, preferred game genre (dichotomized into three categories: preference for MMO games, preference for shooter and preference for puzzle games) and main motivation for playing (dichotomized into three categories: feeling of winning, distraction from problems, and socializing).

Psychopathological Symptoms

The *General Health Questionnaire* (*GHQ-12*; Goldberg & Williams, 1988) was used. The Spanish validation *GHQ* (60, 30 and 12 items) was carried out in the city of Tres Cantos, Madrid, but one of the main limitations of this validation is that it has not been published in any scientific journal, which makes access to this material difficult (Rocha et al., 2011). The *GHQ-12* is a brief general mental health questionnaire, with only 12 items in four-point format, which can be interpreted as a Likert format (0 to 4 points) or dichotomously (0-0-1-1). It is useful in detecting possible cases of mental disorder in the general population or in primary care. The questionnaire items measure two different factors, anxiety and social dysfunction, thus forming two subscales within the test itself. It is a widely used questionnaire, with translations into 11 languages, and adequate psychometric properties: reliability due to internal consistency is a = 0.86, and there is abundant evidence of its validity in the general and other specific populations.

Maladaptive Cognitions

The *Dysfunctional Cognitions in Gaming Scale (DCG Scale)* (Sánchez-Iglesias et al., 2022) was used, comprising 16 items with a five-point Likert-type response format (0 = *Never*; 1 = *Rarely*; 2 = *Sometimes*; 3 = *Many times*; 4 = *Always*), with a scoring range from 0 to 64. There is evidence of excellent internal consistency, $\alpha = 0.91$, as well as adequate indications of validity based on its correlation with the *IGDS9-SF* ($r = .73$; $p < .001$). Its factor structure fits three factors corresponding to: (1) self-esteem, (2) concern about gaming, and (3) compulsion. A higher total score implies more problematic cognitions about video games, and there are no recommended cut-off points.

Procedure

Data were collected by five independent psychology graduate student assessors who were trained to collect assessments through *Gamertest*. Once a school agreed to participate in the study, the assessors distributed the informed consents to the children's parents/guardians, and a date was set on which the assessor would come to carry out the assessment in the classes of the schools that had been selected by stratified random sampling. After collecting informed consent from parents/guardians, the assessment was administered by group on the computers in each school's computer room, with students spending approximately 30-40 minutes completing it. The participants' responses were collected and coded anonymously directly into the computerized database.

Ethical questions arising in this study were favourably assessed in a report from the Deontological Commission of the Faculty of Psychology of the Complutense University of Madrid.

Data analysis

Statistical analyses were carried out using IBM SPSS statistical software version 21 for Windows (IBM Corp. Released, 2012). Descriptive analyses were performed to describe the sample. Different coefficients were also used to analyse simple correlations between problematic video game use (*IGDS9-SF*) and the other variables. On the one hand, for the analysis of the correlation between *IGDS9-SF*, average weekly days of play, psychopathological symptoms and maladaptive cognitions, the Pearson correlation coefficient was used due to the quantitative nature of the variables. On the other hand, to analyse the correlation between *IGDS9-SF*, weekly hours of play, preferred game genre, and motivation for playing, the point-biserial correlation coefficient was used since the relationship of a quantitative variable with variables of a dichotomous nature was being tested. Finally, a stepwise multiple linear regression was performed to determine the statistical usefulness of the predictor variables in predicting problematic video game use. Only variables showing a significant bivariate correlation with *IGDS9-SF* were included in this final analysis.

Results

Of all participants, 15 (2.8%) met criteria for problematic video game use. Regarding IGD, 4 (0.7%) of the adolescents met the relevant criteria. As for gaming habits (see Table 1), the majority of participants: played less than thirty hours a week, chose action and adventure as their preferred genre, chose mobile phones as their preferred device for playing, and preferred to play at home and without company, both online and offline.

Table 1
Gaming habits: Descriptive statistics

		n	%	M	DT
Preferred genre	Action and adventure	121	22.6		
	Gambling	22	4.1		
	Driving	28	5.2		
	Sports	39	7.3		
	Strategy	12	2.2		
	Shooter	22	4.1		
	MMO	46	8.6		
	Music and rhythm	35	6.5		
	Platforms	51	9.5		
	Puzzles and board	77	14.4		
	Roleplay	4	.7		
	Simulators	79	14.7		
Hours/week	≥ 30	5	.9		
	< 30	531	99.1		
Average days/week				2.56	1.74
Preferred place	At home	445	83		
	At friends' home	29	5.4		
	School	20	3.7		
	Gaming centres	15	2.8		
	Outdoors / public transport	27	5		
Preferred company	Alone	321	59.9		
	With someone (physically)	118	22		
	With someone (online)	52	9.7		
	In a group (physically)	24	4.5		
	In a group (online)	21	3.9		
Online/offline preference	Online	115	21.5		
	Offline	147	27.4		
	Both	274	51.1		
Preferred device	Desktop/laptop computer	71	13.2		
	Console	85	15.9		
	Smartphone	277	51.7		
	Tablet	54	10.1		
	Television	49	9.1		
Motivation for playing	Having fun/passing the time	492	91.8		
	Socialising	16	3		
	Feeling of winning	1	.2		
	Testing my skills	10	1.9		
	Distraction from my problems	17	3.2		

Note. N = 536; MMO = massively multiplayer online; Shooter = first person shooter and other shooter games; Socialising = meeting people and being with my friends.

Correlation between playing time, genre, motivation for playing and IGDS9-SF

Of the variables analysed, these showed significant correlations with *IGDS9-SF* scores: weekly hours and average days of gaming per week, preference for MMO games, and playing to distract oneself from problems. The direction of these relationships was positive (Table 2). The average number of weekly days of gaming was the variable that shared the greatest variance with the dependent variable (r = .43), explaining 18.5% of the variance in *IGDS9-SF* (r^2 = .185). Other variables explaining the variance, albeit to a lesser extent, were the preference for MMO games and weekly hours of gaming (r^2 = .036 and r^2 = .020, respectively). Being distracted from problems was the variable that presented the least variance (r = .12), explaining only 1.4% of the variance (r^2 = .014).

Correlation between the DCG Scale factors, the GHQ-12 subscales and IGDS9-SF

All the variables analysed, except social dysfunction on the *GHQ-12*, showed significant correlations with the *IGDS9-SF* scores. For all of them, the direction of the relationship was positive (Table 3). The three factors of the *DCG Scale* were the variables that explained a greater proportion of variance in the *IGDS9-SF* scores. First, compulsion (r^2 = .504), followed by worry (r^2 = .462), and self-esteem (r^2 = .336). Anxiety was the variable that showed the least variance (r = .30), explaining 9% of the variance (r^2 = .09).

Table 2
Correlation between game time, game genre, motivation for playing and IGDS9-SF

Variable	M	DT	1	2	3	4	5	6	7	8
1. IGDS9-SF	13.64	5.35								
2. Hours weekly	.01	.10	.14**							
3. Average days weekly	2.56	1.74	.43**	.14**						
4. MMO	.09	.28	.19**	.11*	.17**					
5. Shooter	.04	.20	.04	-.02	-.02	-.05				
6. Puzzles	.14	.35	-.08	-.04	-.01	-.13**	-.07			
7. Feeling of winning	.002	.04	.03	-.004	.11*	-.01	-.01	-.02		
8. Distraction from one's problems	.03	.18	.12**	.09*	.05	.06	-.03	-.01	-.01	
9. Socialising	.03	.17	.08	-.02	-.03	.03	-.03	-.04	-.01	-.03

Note. MMO = massively multiplayer online; Shooter = first person shooter and other shooter games; Socialising = meeting people and being with my friends; *p < .05; ** p < .01.

Table 3
Correlation between factors of the DCG Scale, the subscales of the GHQ-12 and IGDS9-SF

Variable	*M*	*DT*	1	2	3	4	5
1. IGDS9-SF	13.64	5.35					
2. Self-esteem	6.64	4.89	.58**				
3. Worry	2.16	2.67	.68**	.57**			
4. Compulsion	3.27	3.76	.71**	.73**	.66**		
5. Anxiety	7.89	4.89	.30**	.29**	.15**	.31**	
6. Social dysfunction	5.82	3.25	.04	-.11*	-.03	.04	.34**

Note. *p< .05; ** p< .01.

Table 4
Stepwise multiple regression model of game time, MMO gaming, anxiety, distraction from problems and DCG Scale factors on IGDS9-SF score

	Variable	B	*SE B*	*B*	R^2	ΔR^2
Step 1	Constant	10.36**	.22		.496	.497**
	Worry	1**	.04	.71**		
Step 2	Constant	9.89**	.21		.576	.080**
	Compulsion	.65**	.05	.46**		
	Worry	.76**	.08	.38**		
Step 3	Constant	8.89**	.27		.599	.024**
	Compulsion	.62**	.05	.43**		
	Worry	.66**	.08	.33**		
	Average days weekly	.51**	.09	.17**		
Step 4	Constant	8.09**	.33		.609	.011**
	Compulsion	.56**	.05	.39**		
	Worry	.69**	.07	.34**		
	Average days weekly	.50**	.09	.16**		
	Anxiety	.12**	.03	.11**		

Note. ** $p < .01$.

Risk factors for Problematic Video Game Use

Those variables showing significant bivariate relationships with the *IGDS9-SF* scores were entered into a stepwise multiple linear regression; the results are presented in Table 4. In the first step, the compulsion variable was entered, representing 49.6%. of the variance in the *IGDS9-SF* scores ($R^2 = .496$). In the second step, worry was added to the model, explaining an additional 8% of variance ($\Delta R^2 = .080$). In the third step, the variable entered was the average number of days per week ($\Delta R^2 = .024$) and, in the fourth step, anxiety ($\Delta R^2 = .011$); As a result, the explained variance increased to 60.9% ($R^2 = .609$). The variables excluded from the model were weekly hours of gaming, preference for MMO games, self-esteem, and distraction from problems.

Discussion

The general purpose of the present study was to establish the prevalence and risk factors involved in problematic video game use in a sample of adolescent women from the city of Madrid. More specifically, the objective was to analyse the predictive potential of the following factors: hours and days per week spent playing, preferred game genre, motivation for playing, psychopathological symptoms and maladaptive cognitions related to video games.

The results indicate that the prevalence of problematic video game use was 2.8% and the prevalence of IGD was 0.7%. Other studies have reported higher prevalences for IGD in women, such as 2.7% among Spanish students aged 14 to 18 (OEDA, 2022) or an average rate of 2.54%, according to the review and meta-analysis by Stevens et al. (2021). It is common for IGD prevalence rates to vary across studies given regional differences, different ways of defining the disorder, and methodologies used (Paulus et al., 2018).

In a previous study in which differences in relation to gender were analysed (Labrador et al., 2023), it was found that playing time was greater in men, who spent an average of one day a week more than women, as well as more time in terms of weekly hours spent playing, which was also in line with other studies (Fumero et al., 2020; Gómez-Gonzalvo et al., 2020; Király et al. 2017; Leonhardt & Overå, 2021; Mérelle et al, 2017). Differences were also found in the devices used for playing, as in other studies, (with smartphones preferred by women compared to men, who preferred consoles) (Gómez-Gonzalvo et al., 2020; Ricoy & Ameneiros, 2016), as well as with regard to company (with a greater percentage of women preferring to play alone compared to men, and a greater percentage of men preferring to play in an online group compared to women). Both men and women coincided in game genre preferences, except for simulators, puzzles and music, which were preferred by women. No differences were found between the two in relation to the place from which the game was played.

Cognitive factors are those that have shown greater explanatory power for problematic video game use. Among them, thoughts related to the compulsion factor, which assessed the difficulty of stopping playing once the action had started, are those that contributed the most. These findings are similar to those of Yu et al. (2021), who found that perceived lack of willpower in playing was significantly associated with problematic use in both women and men. Secondly, cognitions related to worry, which assessed the difficulty in concentrating on other activities not related to video game use, is the next most explanatory factor. Again, these results agree with those of Yu et al. (2021), who obtained a significant association between the perceived urge to play and problematic use in both women and men. Thoughts related to the self-esteem factor, which assessed the use of video games as a way of achieving social acceptance, was the only maladaptive cognition which, despite showing a high correlation with problematic use, did not contribute to it. These results do not coincide with those of King and Delfabbro (2016), although the items in their study referred to the individual's self-esteem when comparing their game skills to those in the real world (e.g., "*I can achieve more in a game than anywhere else*"), while those used in the present study include social acceptance and one's own ability with respect to others (e.g., *"I am better than others"*).

Regarding gaming habits, the average number of days per week that adolescents spend playing was also shown to explain problematic use, consistent with a previous study (Jo et al., 2022). However, weekly hours of gaming, although showing a positive correlation with problematic use, did not explain part of its variability. It seems that the amount of time played per day may be more relevant (Karaca et al., 2020; Yesilyurt, 2020). Specifically, Macur and Pontes (2021) found that high-risk players, compared to low-risk players, played three hours more per day on weekdays and up to four and a half more hours at weekends.

In relation to psychopathological symptoms, anxiety has also been a factor contributing, although to a lesser extent, to explaining problematic use of video games. These results coincide with those found in adolescent women (Fumero et al., 2020) and in male and female high school students (Faulkner et al., 2015), but go against those of Cudo et al. (2022), who found a negative correlation between anxiety and problematic use. These differences could reflect a mediating effect of game type and motivation for playing. On the one hand, Cudo et al. (2022) suggest that the harassment women often suffer in online games could be generating a refusal to play among players with greater anxiety, which would protect them from excessive use of video games. Adopting this reasoning, anxiety was perhaps predictive in this study because the offline gaming percentage was higher than online, which would mean fewer adolescents exposed to online harassment who, consequently, would not stop playing for this reason, and would thus still be vulnerable to developing problematic use. On the other hand, Cudo et al. (2022) did not assess the participants' motivation for playing, while in the present study a positive correlation was found between problematic use and playing to distract oneself from problems, which may reflect the use of video games as a strategy to regulate emotions.

Other factors, such as a preference for MMO games and gaming to distract oneself from problems, were not predictors of increased risk despite showing significant correlations with problematic VG use.

Implications for clinical practice

From a practical point of view, knowing which factors increase the risk of developing problematic video game use in a given population can provide a guide for designing prevention programs. Given that there is no clear definition of what type of video game use is harmful and that this activity is not classified as harmful per se, even being potentially beneficial for some users, prevention would be based on promoting adaptive use of video games. Taking into account the differences regarding gaming habits in relation to gender, it is also necessary to consider the relevant factors in the adolescent female population, which has been neglected in most studies, focused more on men. The results of this study highlight the relevance of modifying maladaptive cognitions related to video games in adolescent women, for which techniques, already indicated in the literature, could be included, such as self-recording, Socratic questioning and behavioural experiments (King & Delfabbro, 2020).

Limitations

First, since this is a cross-sectional study, causal inferences cannot be made. Longitudinal studies are needed to determine the direction of causality, that is, whether the associated variables preceded higher levels of problematic video game use, or vice versa. In relation to the assessment of some variables, it was sometimes difficult for players to choose their preferred genre, given that there are some games that belong to several categories, while new genres are continually entering the market. Furthermore, the wide variety of game genres gives rise to different classifications within the literature, making it difficult to compare results between studies. It is also worth noting that, to assess the motivation for playing, none of the instruments developed for this purpose were used, but rather a choice was made between the motivations most frequently found in the literature, so this variable has not been studied rigorously. Furthermore, the self-report technique itself means that the responses may be subject to errors such as social desirability bias, simulation, poor introspection capacity or lack of motivation. Finally, only a small percentage of women met criteria for problematic video game use or IGD, limiting data manipulation and processing.

Future lines of research

Two directions are proposed om which future lines of research can contribute to this area. On the one hand, since the majority of participants did not meet criteria for problematic gaming or a disorder, using a clinical sample with which to carry out comparative studies would be valuable. On the other hand, it would be advisable to assess some factors of interest that were not analysed in the present study, such as perceived harassment in online video games, the assessment of gender stereotypes in video games, or emotional regulation strategies.

Conclusions

The results of this study confirm that there is a prevalence, albeit low, of adolescent women with problematic video game use, and even disorder. These results also suggest that the factors contributing most to explaining problematic use, in this population, are cognitions related to video games, mainly the compulsion to play, followed by the worry about playing. At the same time, the average number of days played per week and a higher anxiety score have been shown to be relevant, although to a lesser extent. In summary, behavioural, physiological and, above all, cognitive aspects seem to be contributing to a greater risk of developing a problem with video games. Despite the limitations, this research is useful given the scarcity of similar studies in the literature, added to the context of the continually rising number of women who practise this leisure activity and could develop problematic behaviour in the future.

Acknowledgements

This study was carried out under project PSI2016-75854-P of the Spanish Ministry of Economy and Competitiveness.

Conflict of interests

The authors declare no conflicts of interest in relation to the study, its authorship, and/or the publication of this manuscript.

References

American Psychiatric Association (2013). *Manual Diagnóstico y Estadístico de los Trastornos Mentales (DSM-5)*. (5ª ed.). Editorial médica panamericana.

Asociación Española de Videojuegos (2021). *La industria del videojuego en España en 2021: Anuario 2021*. http://www.aevi.org.es/documentacion/el-anuario-del-videojuego/

Bonnaire, C. & Baptista, D. (2019). Internet gaming disorder in male and female young adults: The role of alexithymia, depression, anxiety and gaming type. *Psychiatry Research*, *272*, 521-530. https://doi.org/0.1016/j.psychres.2018.12.158

Castro-Sánchez, M., Rojas-Jiménez, M., Zurita-Ortega, F. & Chacón-Cuberos, R. (2019). Multidimensional self-concept and its association with problematic use of video games in Spanish college students. *Education Sciences*, *9*(3), 1-11. https://doi.org/10.3390/educsci9030206

Comunidad Autónoma de Madrid (2017). Buscador de centros educativos. http://www.madrid.org/wpad_pub/run/j/MostrarConsultaGeneral.icm

Cudo, A., Dobosz, M., Griffiths, M. D. & Kuss, D. J. (2022). The relationship between early maladaptive schemas, depression, anxiety and problematic video gaming among female and Male gamers. *International Journal of Mental Health and Addiction*. https:/doi.org/10.1007/s11469-022-00858-2

Entertainment Software Association (2022). *2022 Essential facts: About the video game industry*. https://www.theesa.com/resource/2022-essential-facts-about-the-video-game-industry/

Faulkner, G., Irving, H., Adlaf, E. M. & Turner, N. (2015). Subtypes of adolescent video gamers: A latent class analysis. *International Journal of Mental Health and Addiction*, *13*, 1-18. https://doi.org/10.1007/s11469-014-9501-6

Fumero, A., Marrero, R. J., Bethencourt, J. M. & Peñate, W. (2020). Risk factors of internet gaming disorder symptoms in Spanish adolescents. *Computers in Human Behavior*, *111*, 106416. https:/doi.org/10.1016/j.chb.2020.106416

Goldberg, D. & Williams, P. (1988). *A user's guide to the General Health Questionnaire*. NFER-NELSON.

Gómez-Gonzalvo, F., Molina, P. & Devís-Devís, J. (2020). Which are the patterns of video game use in Spanish school adolescents? Gender as a key factor. *Entertainment Computing*, *34*. 100366. https://doi.org/10.1016/j.entcom.2020.100366

IBM Corp. Released (2012). *IBM SPSS Statistics for Windows, Version 21.0*. Armonk, NY: IBM Corp.

Jo, S. J., Yim, H. W., Jeong, H., Son, H. J. & Lee, H. K. (2022). Prospective association between online game use and risk of Internet Gaming Disorder in Korea: 12-month follow-up results from the iCURE study. *Asia Pacific Journal of Public Health*, *34*(4), 370-376. https://doi.org/10.1177/10105395221084929

Karaca, S., Karakoc, A., Can Gurkan, O., Onan, N. & Unsal Barlas, G. (2020). Investigation of the online game addiction level, sociodemographic characteristics and social anxiety as risk factors for online game addiction in middle school students. *Community Mental Health Journal*, *56*, 830-838. https://doi.org/10.1007/s10597-019-00544-z

King, D. L. & Delfabbro, P. H. (2016). The cognitive psychopathology of Internet gaming disorder in adolescence. *Journal of Abnormal Child Psychology, 44*, 1635-1645. https://doi.org/10.1007/s10802-016-0135-y

King, D. L. & Delfabbro, P. H. (2020). Video game addiction. In C. A. Essau & P. H. Delfabbro (Ed.), *Adolescent Addiction* (pp. 185-213). Academic Press. https://doi.org/10.1016/B978-0-12-818626-8.00007-4

Király, O., Tóth, D., Urbán, R., Demetrovics, Z. & Maraz, A. (2017). Intense video gaming is not essentially problematic. *Psychology of Addictive Behaviors*, *31*(7), 807-817. https://doi.org/10.1037/adb0000316

Labrador, F. J., Bernaldo-de-Quirós, M., Labrador-Méndez, M., Fernández-Arias, I., Estupiñá, F. J., González-Álvarez, M.,… Vallejo-Achón, M. (2019). *Gamertest*. [Web application]. http://www.gamertest.es/

Labrador, F. J., Fernández-Arias, I., Martín-Ruipérez, S., Bernaldo-de-Quirós, M., Vallejo-Achón, M., Sánchez-Iglesias, I.,… Estupiñá, F. J. (2022). Mujeres y videojuegos: ¿A qué juegan las mujeres? *Anales de Psicología / Annals of Psychology*, *38*(3), 508–517. https://doi.org/10.6018/analesps.50428

Labrador, M., Sánchez-Iglesias, I., Bernaldo-de-Quirós, M., Estupiñá, F. J., Fernandez-Arias, I., Vallejo-Achón, M. & Labrador, F. J. (2023). Video Game Playing and Internet Gaming Disorder: A profile of young adolescents. *International Journal of Environmental Research and Public Health, 20,* 7155. https://doi.org/10.3390/ijerph20247155

Laconi, S., Pirès, S. & Chabrol, H. (2017). Internet gaming disorder, motives, game genres and psychopathology. *Computers in Human Behavior*, *75*, 652-659. https://doi.org/10.1016/j.chb.2017.06.012

Leonhardt, M. & Overå, S. (2021). Are there differences in video gaming and use of social media among boys and girls? A mixed methods approach. *International Journal of Environmental Research and Public Health*, *18*(11), 1-13. https://doi.org/10.3390/ijerph18116085

López-Fernández, O. (2018). Generalised versus specific internet use-related addiction problems: A mixed methods study on internet, gaming, and social networking behaviours. *International Journal of Environmental Research and Public Health*, *15*(12), 1-33. https://doi.org/10.3390/ijerph15122913

López-Fernández, F. J., Mezquita, L., Griffiths, M. D., Ortet, G. & Ibáñez, M. I. (2021). El papel de la personalidad en el juego problemático y en las preferencias de géneros de videojuegos en adolescentes. *Adicciones*, *33*(3), 263-272. https://doi.org/10.20882/adicciones.1370

López-Fernández, O., Williams, A. J. & Kuss, D. J. (2019). Measuring female gaming: Gamer profile, predictors, prevalence, and characteristics from psychological and gender perspectives. *Frontiers in Psychology*, *10*, 898. https://doi.org/10.3389%2Ffpsyg.2019.00898

Macur, M. & Pontes, H. M. (2021). Internet Gaming Disorder in adolescence: Investigating profiles and associated risk factors. *BMC Public Health*, *21*, 1547. https://doi.org/10.1186/s12889-021-11394-4

Marraudino, M., Bonaldo, B., Vitiello, B., Bergui, G. C. & Panzica, G. (2022). Sexual differences in Internet Gaming Disorder (IGD): From psychological features to neuroanatomical networks. *Journal of Clinical Medicine*, *11*(4), 1-19. https://doi.org/10.3390/jcm11041018

McLean, L. & Griffiths, M. D. (2013). Female gamers: A thematic analysis of their gaming experience. *International Journal of Games-Based Learning, 3*(3), 54–71. https://doi.org/10.4018/ijgbl.2013070105

Mérelle, S.Y.M., Kleiboer, A.M.; Schotanus, M.; Cluitmans, T.L.M.; Waardenburg, C.M.; Kramer, D.,… van Rooij, A. J. (2017). Which health-related problems are associated with problematic video-gaming or social media use in adolescents? A large-scale cross-sectional study. *Clinical Neuropsychiatry: Journal of Treatment Evaluation*, *14*, 11–19.

Mihara, S. & Higuchi, S. (2017). Cross-sectional and longitudinal epidemiological studies of Internet gaming disorder: A systematic review of the literature. *Psychiatry and Clinical Neurosciences*, *71*(7), 425-444. https://doi.org/10.1111/pcn.12532

Observatorio Español de las Drogas y las Adicciones (2022). *Informe sobre Adicciones Comportamentales 2021: Juego con dinero, uso de videojuegos y uso compulsivo de internet en las encuestas de drogas y otras adicciones en España EDADES y ESTUDES.* Ministerio de Sanidad. Delegación del Gobierno para el Plan Nacional sobre Drogas.

Observatorio Español de las Drogas y las Adicciones (2023). Encuesta sobre uso de drogas en enseñanzas secundarias en España (ESTUDES), 1994-2023. Ministerio de Sanidad. Delegación del Gobierno para el Plan Nacional sobre Drogas.

Organización Mundial de la Salud (2018). *Clasificación Internacional de Enfermedades, 11ª revisión.* https://icd.who.int/es

Paulus, F. W., Ohmann, S., von Gontard, A. & Popow, C. (2018). Internet gaming disorder in children and adolescents: A systematic review. *Developmental Medicine and Child Neurology*, *60*(7), 645-659. https://doi.org/10.1111/dmcn.13754

Pontes, H. M. & Griffiths, M. D. (2015). Measuring DSM-5 Internet Gaming Disorder: Development and validation of a short psychometric scale. *Computers in Human Behavior*, *45*, 137-143. https://doi.org/10.1016/j.chb.2014.12.006

Ricoy, C. & Ameneiros, A. (2016). Preferencias, dedicación y problemáticas generadas por los videojuegos: Una perspectiva de género. *Revista Complutense de Educación, 27*(3), 1291-1308. https://doi.org/10.5209/rev_RCED.2016.v27.n3.48445

Rocha, K. B., Pérez K, Rodríguez-Sanz, M., Borrell, C. & Obiols, J. E. (2011). Propiedades psicométricas y valores normativos del General Health Questionnaire (GHQ-12) en población general española. *International Journal of Clinical and Health Psychology*, *11*(1), 125-139.

Sánchez-Iglesias, I., Bernaldo-de-Quirós, M., Estupiñá, F., Fernández-Arias, I., Labrador, M., Vallejo-Achón, M.,… Labrador, F. J. (2022). Maladaptive cognitions in adolescents and young adults when they play: The Dysfunctional Cognitions in Gaming Scale (DCG). *Sustainability*, *14*(23), 1-15. https://doi.org/10.3390/su142316109

Sánchez-Iglesias, I., Bernaldo-de-Quirós, M., Labrador, F. J., Estupiñá, F. J., Labrador, M. & Fernández-Arias, I. (2020). Spanish validation and scoring of the internet gaming disorder scale-short-form (IGDS9-SF). *The Spanish Journal of Psychology*, *23*. https://doi.org/10.1017/SJP.2020.26

Stevens, M. W., Dorstyn, D. Delfabbro, P. H. & King, D. L. (2021). Global prevalence of gaming disorder: A systematic review and meta-analysis. *Australian and New Zealand Journal of Psychiatry*, *55*(6), 553-568. https://doi.org/10.1177/0004867420962851

Wang, H. R., Cho, H. & Kim, D. J. (2018). Prevalence and correlates of comorbid depression in a nonclinical online sample with DSM-5 internet gaming disorder. *Journal of Affective Disorders*, *226*, 1-5. https://doi.org/10.1016/j.jad.2017.08.005

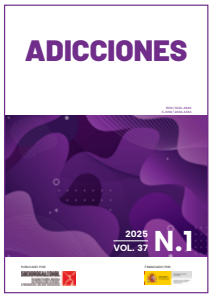
Warburton, W. A., Parkes, S. & Sweller, N. (2022). Internet Gaming Disorder: Evidence for a risk and resilience approach. *International Journal of Environmental Research and Public Health*, *19*(9), 1-15. https://doi.org/10.3390/ijerph19095587

Yesilyurt, F. (2020). Gaming duration and preferences: Relationships with psychiatric health, gaming addiction scores and academic success in high school students. *International Education Studies*, *13*(12), 111-119. https://doi.org/10.5539/ies.v13n12p111

Yu, Y., Mo, P. K., Zhang, J., Li, J. & Lau, J. T. (2021). Why is Internet gaming disorder more prevalent among Chinese male than female adolescents? The role of cognitive mediators. *Addictive Behaviors*, *112*, 106637. https://doi.org/10.1016/j.addbeh.2020.106637

SOCIDROGALCOHOL
Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías

ADICCIONES
2025 ■ VOL. 37 ■ N. 1 ■ PAGES 73–84
www.adicciones.es



ORIGINAL

Healthcare professionals' perception of prolonged-release buprenorphine in opioid use disorder. FOLIPRO Study

Percepción de los profesionales sanitarios sobre la buprenorfina de liberación prolongada en el trastorno por consumo de opioides. Estudio FOLIPRO

Rodrigo Oraá*†; Diego Sucunza Guibert**; María Yébenes Cortés***; Miguel Ángel Casado Gómez***; José Joaquín Antón Basanta****†; Francisco Pascual Pastor*****†; Carlos Roncero******†.

* Red de Salud Mental Bizkaia. Osakidetza. Red de salud mental – ISS Biocruces Bizkaia. ** Camurus SL, Madrid, Spain. *** Pharmacoeconomics & Outcomes Research Iberia (PORIB), Madrid. **** Presidente de la Sociedad Española de Sanidad Penitenciaria (SESP). Médico en Centro Penitenciario Albolote Granada. ***** Presidente Sociedad Científica Española para el Estudio del Alcohol, el Alcoholismo y las otras Toxicomanías, SOCIDROGALCOHOL. Coordinador Unidad Conductas Adictivas Alcoi, Alicante. ****** Health Science Faculty, European University Miguel de Cervantes (UEMC), Valladolid. Network of Research In Primary care of Addictions (RIAPAD). Psychiatric Unit, School of Medicine, University of Salamanca. Institut of Biomedicine (IBSAL), Salamanca, Spain.
† Joint coordination of the study.

Abstract

The aim of the FOLIPRO study was to determine the satisfaction and expectations of healthcare professionals with experience in opioid use disorders (OUD) with prolonged-release buprenorphine (PRB). FOLIPRO was designed as an anonymous, cross-sectional, multicenter survey aimed at professionals from addiction centers (AC) and penitentiary centers in Spain. The survey collected characteristics of the AC and the healthcare professionals. Possible barriers associated with the prescription of PRB in OUD treatment were also identified. Seventy-four questionnaires were received from 45 different centers. More than half of the centers, 51.1%, were outpatient methadone (MTD) dispensing centers and 31.1% were penitentiary centers. 68.5% of the participants had experience with PRB, which exceeded 6 months in 58.3% of the cases. 31.5% stated that they had no experience, 40% of them mainly due to reimbursement criteria for PRB. Regarding prescribing/administration issues, professionals reported greater satisfaction with PRB compared to MTD and buprenorphine/naloxone (SL-BPN/NX). According to healthcare professionals, bureaucracy, lack of knowledge of some prescribers, and patient refusal due to fear of opioid withdrawal were the main barriers described in for prescribing PRB. The results of the study show high satisfaction among healthcare professionals with PRB, positioning PRB as a valuable treatment option.
Keywords: Opioid Use Disorder, opioid substitution treatment, satisfaction, expert opinion, prolonged-release buprenorphine

Resumen

El objetivo del estudio FOLIPRO fue determinar la satisfacción y expectativas de profesionales sanitarios expertos en el trastorno por consumo de opioides (TCO) con las formulaciones de buprenorfina de liberación prolongada (BLP). Diseñado como una encuesta transversal y multicéntrica en la que participaron de forma anónima profesionales pertenecientes a centros de adicciones (CA) y centros penitenciarios de España, incluyó preguntas sobre las características de los centros y sobre las características laborales de los profesionales sanitarios. Igualmente se identificaron las posibles barreras asociadas a la prescripción de la BLP en el tratamiento del TCO. Se recibieron 74 cuestionarios de 45 centros diferentes. El 51,1% y 31,1% fueron centros ambulatorios de dispensación de metadona (MTD) y centros penitenciarios, respectivamente. El 68,5% de los profesionales sanitarios tenían experiencia con BLP que superaba los 6 meses en el 58,3%. El 31,5% afirmó no tener experiencia señalando como principal causa (en un 40%) los criterios de financiación de la BLP. En todos los aspectos relacionados con la prescripción/administración, los profesionales transmitieron una mayor satisfacción con BLP en comparación con MTD y buprenorfina/naloxona sublingual (BPN/NX SL). La burocracia, el desconocimiento por parte de los prescriptores y el rechazo del paciente por temor al síndrome de abstinencia a opioides, fueron a juicio de los encuestados las principales barreras descritas a la hora de prescribir la BLP. Los resultados del estudio evidencian una alta satisfacción de los especialistas con BLP que podría posicionarse como una alternativa de tratamiento con respecto a las disponibles en el TCO.
Palabras clave: Trastorno por consumo de opioides, tratamiento sustitutivo de opioides, satisfacción, opinión de expertos, buprenorfina de liberación prolongada

■ *Received: November 2023; Accepted: March 2024.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
María Yébenes Cortés. Pharmacoeconomics & Outcomes Research Iberia (PORIB). Paseo Joaquín Rodrigo 4. Letra I, 28224 Pozuelo de Alarcón, Spain. Email: myebenes@porib.com

Opioid use disorder (OUD), recognised as a serious health problem, is a chronic and multifactorial disease involving a loss of control in the use of opioids (Bell & Strang 2020; Dematteis et al., 2017). Opioid dependence treatment (ODT) is considered the basis of treatment alongside psychosocial therapy (Cioe et al., 2020; Dematteis et al., 2017). Methadone (MTD) and buprenorphine in monotherapy or in combination with naloxone (NX) are the most frequently used ODT in Europe, with percentages of 63% and 35% of all ODT, respectively (Marco et al., 2013; Pascual et al., 2022; Pascual Pastor et al., 2023). It is estimated that in 2021, approximately 524,000 people in the European Union, equivalent to half of the patients with high-risk opioid use, received treatment with opioid agonists. Restrictive policies, the shortage of specialists able to prescribe them due to lack of knowledge, the limited number of pharmacies dispensing them and the associated costs have been identified as possible barriers to treatment access (EMCCDA, 2021, 2023).

Despite sufficient available evidence regarding their effectiveness in reducing opioid use and reducing morbidity and mortality in patients with OUD (Cioe et al., 2020; Pascual Pastor et al., 2023), these treatments may be limited by poor adherence to treatment recommendations, probably linked, among other factors, to the need for daily administration, and high relapse and dropout rates (Bell & Strang 2020; Pascual Pastor et al., 2023; Strang et al., 2020). Alongside these problems, other issues such as diversion of the drugs and illegal sales have prompted interest in focusing the treatment of OUD on other types of formulations that could mitigate these aspects (Andrilla et al., 2020; Lin et al., 2018; López-Briz & Giner García, 2021). Prolonged-release buprenorphine (PRB) formulations in the form of an implant or subcutaneous injections that provide drug release over weeks or months are considered an alternative to traditional ODT (Pascual et al., 2022; Vorspan et al., 2019). Nevertheless, they are underused, and this may be associated with professional and institutional barriers preventing their promotion (Yarborough et al., 2016).

Tackling addictive behaviours requires a multidisciplinary approach in which the treatment decision is agreed between doctor and patient (Cioe et al., 2020; Yarborough et al., 2016). To this end, it is necessary to understand and appreciate all aspects relating to pharmacotherapy. The knowledge and beliefs of the professionals involved in caring for these patients are essential when selecting the treatment and can consciously or unconsciously affect the decision of the patient and, therefore, the effectiveness of the treatment. Professionals need to guarantee that the information they provide is complete and free of the myths surrounding this type of medication to educate and communicate to patients the different treatment options available without any type of bias. Knowing and understanding the needs and preferences of patients with OUD, as well as those of the professionals involved in their care, are thus key to ensuring successful treatment (Cioe et al., 2020; Roncero et al., 2016; Yarborough et al., 2016).

Although different studies have been carried out in recent years presenting the perception of professionals caring for patients suffering from addictions regarding ODT (BUP, MTD, NX and BUP/NX), describing possible barriers related to treatment access (Andraka-Christou et al., 2022; Andrilla et al., 2020; Cioe et al., 2020; Lin et al., 2018), evidence in real clinical practice in Spain is limited. In a recent systematic review of studies from different countries (none from Spain) regarding the preference of patients and professionals for OUD, it was clear that dependent patients are most concerned about stigma and misinformation, while health care professionals (HCP) see the lack of training and resources as the main barriers to ODT (Cioe et al., 2020).

In Spain, the most recent studies assessing perceptions of OUD treatment are fundamentally based on the opinions of patients (Pascual et al., 2022; Pascual Pastor et al., 2023). In the authors' opinion, the FOLIPRO study [Spanish acronym: FOrmulaciones de LIberación PROlongada, i.e., prolonged-release formulations] is the first to explore and attempt to understand the perceptions of the different profiles of HCP involved caring for OUD patients with PRB and their opinion when comparing to MTD and SL-BUP/NX, the most used ODTs in Spain (Roncero et al., 2015). Likewise, the study identified the possible barriers that exist around the prescription of PRB.

Method

Study design

The FOLIPRO study is an anonymous cross-sectional remote (online) survey aimed at Spanish HCP with experience in managing patients with OUD in addiction centres (AC) or prisons. The Euskadi Drug Research Ethics Committee (CEIm-E) approved the study, which was endorsed by SOCIDROGALCOHOL (the Spanish Scientific Society for the Study of Alcohol, Alcoholism and Other Drug Addictions), the Spanish Society of Dual Pathology (SEPD). and by the Spanish Society of Prison Health (SESP).

Study objectives

The main objective was to determine the expectations and satisfaction of healthcare professionals with PRB in the treatment of patients with OUD. As secondary objectives, the characteristics of the HCP and their centres were described. In addition, the opinion of the experts on certain aspects of PRB and its comparison with MTD

and SL-BPN/NX was valued, as was their appreciation of the barriers that may exist to the prescription of PRB and possible advantages that it could contribute with in the treatment of OUD.

As a requirement, participants had to have experience in managing patients with OUD and knowledge of PRB formulations, regardless of whether or not they had experience in prescribing and using the medication.

Specialists in psychiatry, family medicine, nursing and experts in addiction medicine were contacted by email through administration staff at SOCIDROGALCOHOL, SEPD and SESP. The survey was circulated to members of the three societies. Three reminder emails were sent to encourage participation.

As an essential requirement for completing the survey, the instructions attached to the email specified the need to have experience in managing patients with OUD. Experience in prescribing and/or administering PRB was not an exclusion criterion, but all participants had to know its characteristics.

Survey and data collection

Between October 2022 and February 2023, the specialists were sent a link to the survey once they had accepted the study invitation email. The survey was completed on the basis of the professionals' knowledge, experience or expectations regarding PRB formulations. Hospital records or patients' clinical histories were not accessed at any time.

The survey questions were structured in five blocks based on the objectives of the study: characteristics of the participating centres, characteristics of the HCP, satisfaction of HCP with PRB, description of the PRB characteristics that would improve the approach to OUD, and description of the barriers associated with PRB prescription.

To know the degree of satisfaction of professionals with experience in prescribing and/or administering PRB and their opinion regarding its effectiveness, two numerical scales were used in which these aspects were rated from 0 to 10 (0 = Not at all satisfied/Not at all effective, and 10 = Totally satisfied/Totally effective). All participants, irrespective of whether they prescribed or administered PRB, answered a battery of questions assessing their perception, based on their knowledge, of different aspects related to the prescription/administration, efficacy/effectiveness and safety of PRB compared to MTD and SL-BPN/NX.

Statistical analysis

A descriptive analysis was carried out to calculate the means and standard deviations for quantitative variables. For qualitative variables, frequency distributions with their respective percentages were calculated from the professionals' valid answers. All analyses were carried out with Jamovi 2.3.16 software.

Results

During the study period, 74 surveys were received from 45 different centres in Spain (Canary Islands, Cantabria, Castilla La Mancha, Balearic Islands, Castilla y León, Andalusia, Valencian Community, Madrid Community, Galicia, Catalonia and the Basque Country). The Basque Country, Catalonia and Galicia were the autonomous communities with the highest participation rate, with 39.2%, 17.6% and 10.8% of responses, respectively, of the total number of surveys sent out.

Characteristics of the participating centres

As shown in Table 1, a little more than half (51.1%) of all the treatment centres for patients suffering from addiction were public and outpatient centres for dispensing MTD, treating an average of 177 OUD patients during the year prior to the study. Prison centres represented 31.1% of the total, with an average of 380 patients treated in the previous year. In relation to the treatment provided during the previous year, 69%-74% of patients received MTD, 21%-24% SL-BPN/NX and 3%-7% PRB, according to the professionals surveyed (Table 1).

Characteristics of health care professionals

Approximately 60% of the HCP who completed the study survey were psychiatrists, with an average experience in treating OUD of 18.9 years (Standard Deviation [SD]: 10.9), as shown in Table 2. The group with the second highest participation was nursing staff (25.7% of responses received), with an average of 18.5 (SD: 10.9) years of experience in managing patients with OUD. According to the professionals, the average number of patients with OUD treated in the previous year in the participating centres was 95.1 (SD: 110.9). For 69% of these patients, MTD was the most frequently dispensed treatment, followed by SL-BPN/NX for 24% and PRB for 8% of patients (Table 2).

Experience with prescribing and/or administering PRB was reported by 68.5% of HCP, with 58.3% of them for more than 6 months. While 31.5% of the HCP had no experience, they were familiar with the drug and its properties. For 40% of them, the main reason behind the lack of experience in using the drug was the lack of patients who met the reimbursement criteria of the Ministry of Health (patients being treated with oral BPN/NX, inadequately stabilized or with treatment adherence problems). Moreover, 20% of HCP indicated that they had not received training in the use of PRB (Table 2).

Healthcare professionals' satisfaction with prolonged-release buprenorphine

The average score on the scale (0-10) assessing the professionals' degree of satisfaction with the experience of prescribing/administering PRB was 8.7 points. The average score on the numerical scale assessing effectiveness was 8.8

Table 1
Characteristics of the healthcare centres where the participating professionals work

Variable	**Centre / %**		
Type of healthcare centre	**N= 45 (100)**		
Outpatient, dispensing MTD	23 (51.1)		
Outpatient, not dispensing MTD	3 (6.6)		
Treatment centre	2 (4.4)		
Prison centre	14 (31.1)		
Hospital detoxification unit	3 (6.6)		
Patients with OUD treated in the year prior to the study	**Mean (SD)**		
Outpatient, dispensing MTD	177.09 (177.96)		
Outpatient, not dispensing MTD	380 (4.42)		
Treatment centre*	5 (-)		
Prison centre	380.07 (472.4)		
Hospital detoxification unit*	30 (-)		
Patients with OUD treated by centre in the previous year, by type of treatment	**MTD (%)**	**SL-BPN/NX (%)**	**PRB (%)**
Outpatient centre	69%	24%	7%
Treatment centre	74%	21%	5%
Prison centre	73%	21%	6%
Hospital detoxification unit	74%	22%	3%

Note. PRB: prolonged-release buprenorphine; BPN: buprenorphine; SL: sublingual; SD: standard deviation; MTD: methadone; NX: naloxone; OUD: opioid use disorder.
*Of the total number of responses, only one provided a valid response; this value is presented.

Table 2
Characteristics of the participating health care professionals

Variable	**Centre / %**
Health care professional specialty	**N (%)**
Psychiatry	44 (59.5)
Addiction	3 (4)
Nursing	19 (25.7)
Family doctor	5 (6.8)
No specified specialty	3 (4)
Years of experience	**Mean (SD)**
Psychiatry	18.9 (10.9)
Addiction	16.0 (10.2)
Nursing	18.5 (10.9)
Family doctor	17.6 (10.3)
Patients with OUD treated per specialty in the year prior to the study	**Mean (SD)**
Psychiatry	90.57 (110.1)
Addiction	102.96 (107.0)
Nursing	87.40 (109.9)
Family doctor	100 (102.3)
Patients with OUD treated by a health care professional in the last year	**Mean patients (SD)** **95.1 (110.9)**
Patients treated with MTD	69%
Patients treated with SL-BPN/NX	24%
Patients treated with PRB	8%
Professionals with experience of PRB formulations (N=73)	
Yes	50 (68.5)
No	23 (31.5)
Time prescribing/administering PRB in experienced HCP (N=48)	**N (%)**
Under 6 months	12 (25)
Approximately 6 months	8 (16.7)
Over 6 months	28 (58.3)
Reasons for lack of experience in HCP (N=20)	**N (%)**
Non-availability or limited availability at AC level	2 (10)
Lack of training or knowledge regarding PRB use	4 (20)
Lack of patients meeting the Ministry of Health criteria	8 (40)
Other reasons	6 (30)
Knowledge of PRB characteristics in inexperienced HCP (N=21)	**N (%)**
Yes	19 (90.5)
No	2 (9.5)

Note. PRB: prolonged-release buprenorphine; BPN: buprenorphine; SL: sublingual; SD: standard deviation; AC: autonomous community MTD: methadone; NX: naloxone; OUD: opioid use disorder.

Figure 1
Satisfaction questionnaire results

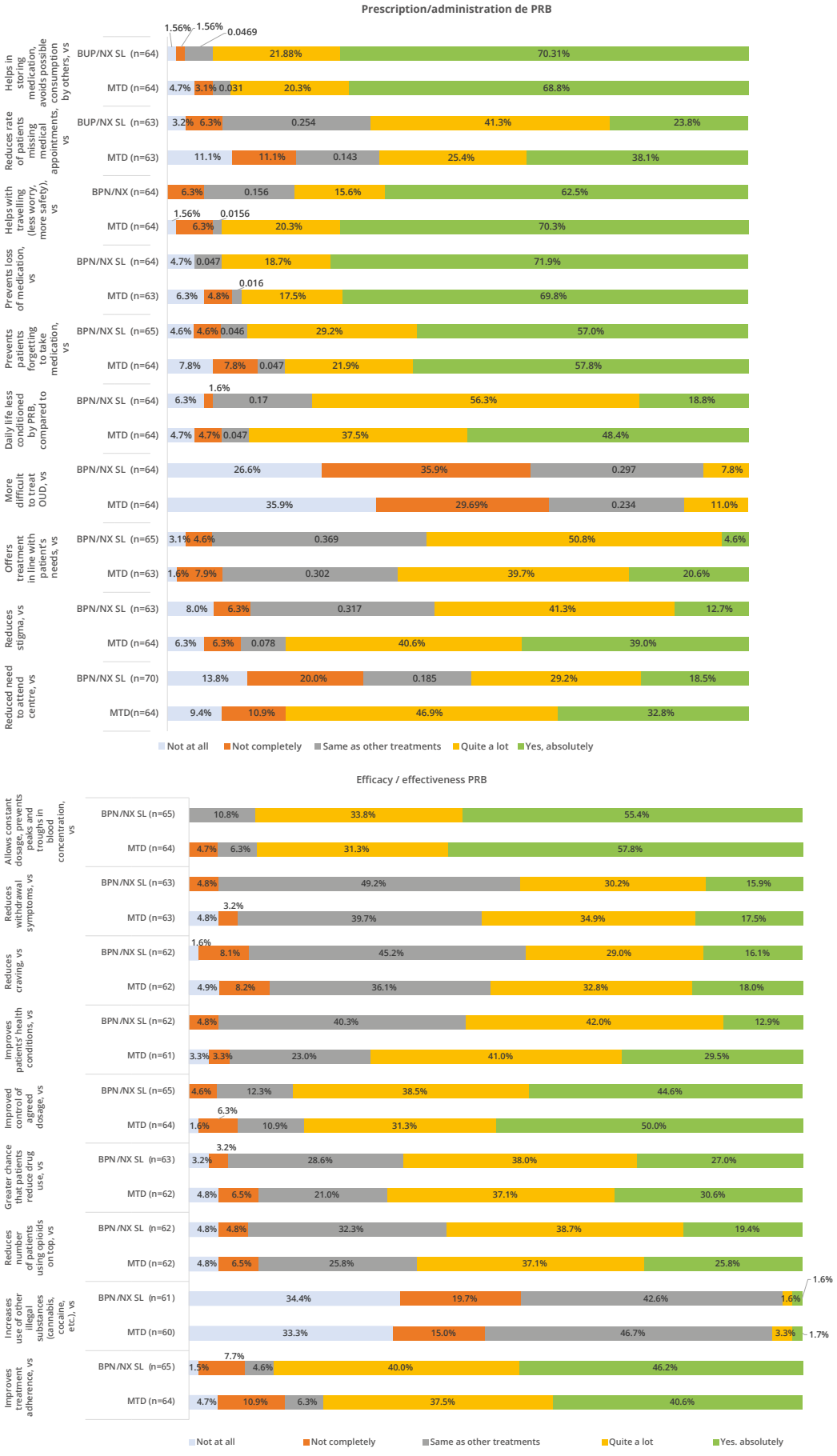
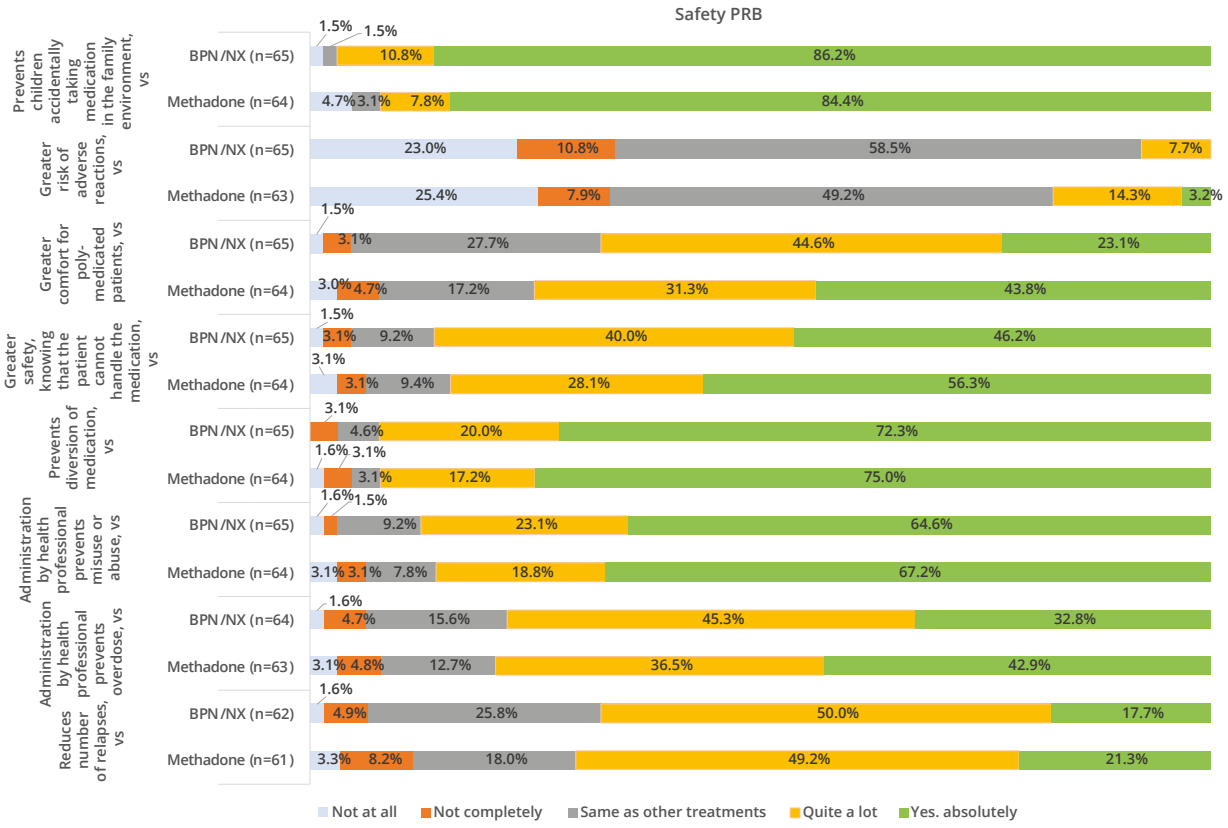


Figure 1
Satisfaction questionnaire results



Note. PRB: prolonged-release buprenorphine; BPN: buprenorphine; SL: sublingual; MTD: methadone; NX: naloxone. Percentages were calculated based on the total responses indicated by the researchers. Missing values were not considered.

points; both scores reflect a high degree of acceptance of PRB among specialists who use PRB.

The results of the satisfaction questionnaire on HCP's opinion of PRB compared to MTD and SL-BPN/NX are presented in Figure 1. Regarding prescription and administration, the three main factors were being able to travel more safely and with less worry (70.3% of those surveyed), preventing the loss of medication (69.8%) and not having to store the medication, preventing possible use by third parties (68.8%). With the rating "quite a lot", greater satisfaction was perceived with PRB than MTD in aspects related to the reduction of the care burden (for 46.9% of the professionals), the reduction of stigma (for 40.6% of the respondents) and the possibility of offering a treatment more in line with patients' needs (for 39.7%) (Figure 1).

Compared to SL-BUP/NX, professionals perceived greater satisfaction with PRB, which they rated with the factor "Yes, absolutely" in aspects related to loss of medication (for 71.9%), storage conditions (for 70.3% of respondents) and likelihood of travelling more safely and with fewer worries (for 62.5%). The rating "quite a lot" was given to aspects compared to SL-BUP/NX, related to the limitations patients may have in their daily lives (for 56.3%), the possibility of offering a treatment more in line with the patient's needs (for 50.8%) and that it could reduce stigma and the rate of patients who do not attend scheduled visits with the doctor (both aspects reported by 41.3% of respondents).

In relation to efficacy and effectiveness, the factor that healthcare professionals indicated as "absolutely more satisfactory" with PRB compared to MTD and SL-BUP/NX was being able to achieve a constant dose, thus avoiding concentration peaks and troughs (57.8% of HCP were more satisfied with PRB than with MTD, and 55.4% preferred PRB to SL-BUP/NX). Allowing better monitoring of the prescribed dose with PRB was the second factor in which respondents indicated greater satisfaction (with the "absolutely" rating) compared to MTD (50% of respondents) and compared to SL-BUP/NX (44.6%). The third highest rated aspect was in the improvement of adherence with PRB compared to MTD (for 40.6%) and to SL-BUP/NX (for 46.2%). In reducing craving, the majority of professionals reported that they thought PRB had the same efficacy as MTD (according to 36.1% of professionals) and SL-BUP/NX (for 45.2% of respondents). Similarly, they thought that PRB was equally

effective as MTD and SL BPN/NX to reduce withdrawal (39.7% and 49.2% of respondents respectively). (Figure 1).

With regard to safety, the three variables with the highest percentage of responses indicating a greater preference for PRB compared to MTD and SL-BUP/NX, scored with the rating "yes, absolutely," were the possible reduction in accidental consumption by children, 84.4% versus MTD and 86.2% versus SL-BUP/NX; the possibility of avoiding substance diversion (75% compared to MTD and 72.3% compared to BUP/NX) and the possibility that with PRB, treatment misuse or abuse would be avoided simply by the fact that administration was carried out by a HCP (67.2% of HCP indicated a preference for PRB over MTD and 64.6% over SL-BUP/NX). Regarding relapses, 49.2% of professionals showed a preference for PRB, rating the reduction as "quite satisfactory" compared to MTD and 50.0% compared to SL-BUP/NX. Regarding the possibility of the patient suffering some type of adverse reaction with ODT, for the majority of respondents thought PRB had the same probability as MTD (for 49.2% of respondents) and SL-BUP/NX (58.5% of respondents) (Figure 1).

Characteristics of prolonged-release buprenorphine formulation

Given the characteristics related to weekly or monthly subcutaneous administration, 87.7% of HCP thought that PRB provided greater comfort compared to MTD and 81.3% compared to SL-BPN/NX in aspects related to adherence, satisfaction, retention and security, as shown in Figure 2. The transition from SL-BPN/NX to PRB was considered easy for 96.9% of professionals, while the transition from MTD to PRB was considered complex for 62.9%.

In relation to the question whether the HCPs considered that patients with OUD had sufficient information regarding different therapeutic options for their disease and the characteristics of each of the drugs, 59.4% stated that there was a lack of knowledge amongst patients (Figure 2).

Barriers associated with the prescription of prolonged-release buprenorphine

Figure 3 shows the barriers associated with the prescription of PRB. Fear of opioid withdrawal syndrome (OWS),

Figure 2
Healthcare professionals' assessment of the characteristics of prolonged-release buprenorphine versus methadone and buprenorphine/naloxone

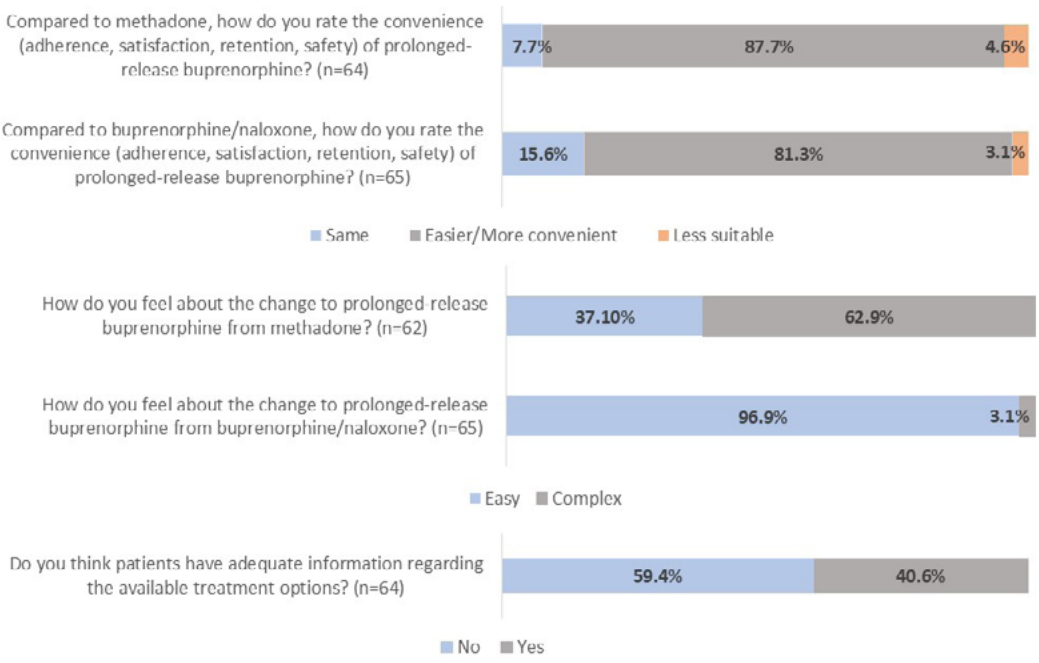
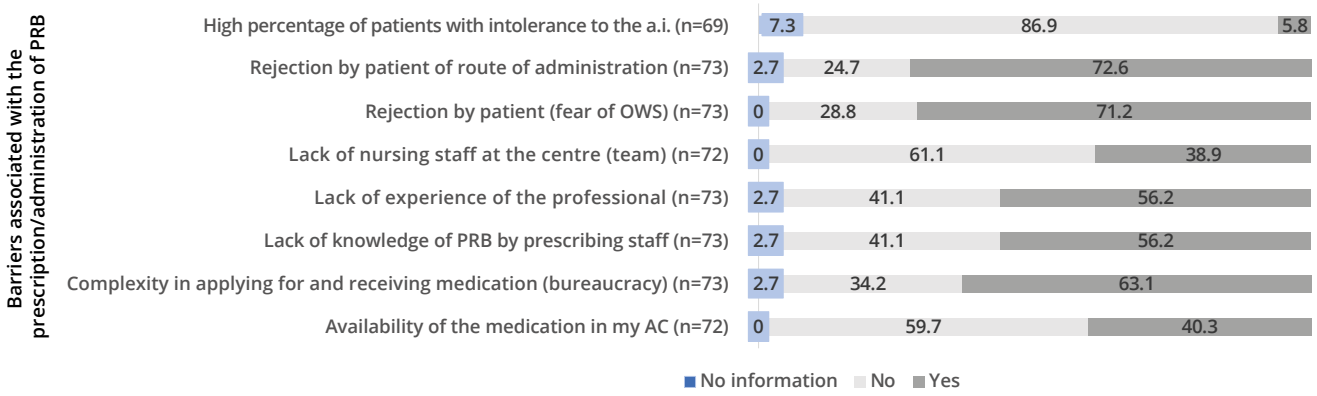
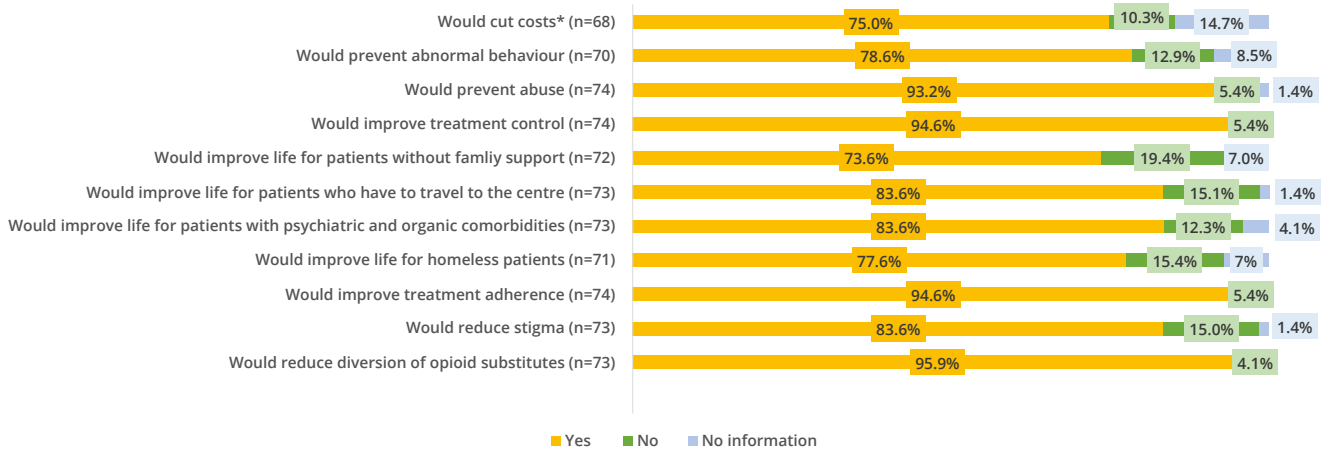


Figure 3
Barriers associated with the prescription/administration of prolonged-release buprenorphine



Note. PRB: prolonged-release buprenorphine; CA: autonomous community; OWS: opioid withdrawal syndrome; a.i.: active ingredient. *In parentheses, the percentages of answers obtained for each of the variables with respect to the total number of professionals who answered the questionnaire (74).

Figure 4
Situations or type of patients in which health professionals believe the administration of prolonged-release buprenorphine would improve the approach to OCT replacement treatments



Note. *Cost savings for the health system (through possible increase in adherence and thus reduction in the number of relapses and overdoses).

the patient's rejection of the route of administration, the complexity involved in applying for and receiving PRB, and the prescriber's lack of knowledge were the main barriers identified by the HCP surveyed (Figure 3).

Perceived advantages of PRB

Figure 4 shows situations in which the characteristics of PRB could improve the treatment of OUD patients compared to MTD and SL-BUP/NX. Professionals believed that PRB could make it more difficult to divert opioid agonists to the black (or illegal) market (according to 95.9% of respondents), could improve adherence (according to 94.6%) as well as treatment control (for 94.6%) and avoidance of medication misuse (for 93.2% of professionals), among other aspects (Figure 4).

Discussion

The results obtained in the FOLIPRO study show good acceptance and satisfaction regarding PRB by the surveyed HCP involved in the management and care of OUD patients. The survey results illustrate the benefits that this type of formulation could provide in the treatment of OUD compared to two of the most widely used treatment options in Spain, while also outlining the possible barriers related to its prescription and administration.

The data obtained from this survey report greater satisfaction with PRB compared to MTD and SL-BPN/NX in practically all aspects relating to prescription/administration, efficacy/effectiveness and safety.

In the opinion of the professionals surveyed, when compared to MTD and BUP/NX SL, PRB has

characteristics that make it a treatment more in line with the needs of OUD patients, with less likelihood of losing the medication and its consumption by third parties due to storage issues, less stigma and a reduction in the need to attend treatment centres in person. These results are in line with those obtained by Pascual Pastor et al. (2023), who assessed the satisfaction and experience of Spanish OUD patients with their treatment. Patients, both those receiving MTD and SL-BUP/NX, reported feeling "very bothered" or "fairly bothered" by the need to pick up medication frequently (daily or weekly) and feeling shame or stigma because of the practically daily supervision of their treatments (Pascual Pastor et al., 2023). The social stigma surrounding dependent individuals is a well-known and reocurring theme, as reflected in one of the main conclusions in the systematic review by Cioe et al. (2020). Patients undergoing treatment with MTD sometimes feel reluctant to be open about their treatment with their family and social environment for fear of discrimination, and although MTD has afforded them a positive change in their lives, they feel stigmatized. Having to frequently pick up medication and have it monitored can be an aspect that makes work and other daily activities difficult for the patient, thereby limiting their quality of life (Cioe et al., 2020).

Together with the very nature of the addiction disorder, ODTs requiring daily administration increase the possibility of the drugs being diverted needed (Pascual Pastor et al., 2023). In the FOLIPRO study, the preference of health professionals (almost two thirds of those surveyed) for PRB is evident; due to that it can only be administered by expert health professionals, and therefore reduces the possibility of misuse compared to treatment with MTD and SL-BUP/NX, and so reduces or prevents its misuse (or abuse). Concern about diversion with SL-BUP/NX treatment is widespread among healthcare professionals (Cioe et al., 2020) since it can lead, even in a low percentage, to an increase in relapses and accidental overdoses (Cioe et al., 2020; Pascual Pastor et al., 2023).

Diversion may sometimes be linked when there is lack of clinic medication supply. The lack of resources (institutional, educational, economic) and the lack of training of health care workers could be causes related to the barrier of prescribing buprenorphine and the lack of its availability. In our study, although all the professionals surveyed were familiar with the characteristics of PRB, 31.5% reported not having any experience in prescribing and/or administering the drug, due to lack of training in 20% of the cases.

Training related to buprenorphine and its administration is essential for PRB to be considered another option alongside other ODT. In a cross-sectional analysis with specialists in psychiatry, it was observed that those who had not received training regarding the drug expressed greater reluctance when prescribing it compared to specialists who had been trained (Suzuki et al., 2014). Other studies (Louie et al., 2019; Mendoza et al., 2016) emphasize the importance of such training to avoid erroneous approaches or any scepticism that specialists may transmit to patients with OUD. In a study conducted with family physicians and experts in the treatment of patients with OUD, inadequate staff training, lack of access to addiction experts, and the perceived effectiveness of buprenorphine were identified as major barriers to prescribing buprenorphine (DeFlavio et al., 2015).

In any treatment decision, especially in OUD, it is essential that there is correct communication between doctors and patients and that both participate in making treatment decisions, aspects that could enhance adherence and thus the chances of treatment success (Yarborough et al., 2016). To do this, it is important that patients receive accurate and unbiassed information from specialists about each treatment option, debunking myths and educating them without prejudice (DeFlavio et al., 2015). More than half of the professionals surveyed in the study (59.4%) considered that patients with OUD do not have all the information they need regarding the different options.

Although professionals showed a high degree of preference for PRB and more than 80% found it more comfortable/convenient to use compared to MTD and SL-BPN/NX, the percentage of use is low considering the number of patients treated by respondents in the year prior to the start of the study who could have benefitted from it.

The main barriers to prescribing PRB reported in the study, and which could contribute to this underuse of PRB, were access at autonomous community level, the complexity involved in applying for and receiving the medication, and the paucity of patients who meet the criteria established by the Ministry of Health.

Knowing the preferences of specialists, as well as those of patients, their preferences for ODT, and identifying the factors that could improve the treatment and attitude of the ODT patient are essential for successful treatment of these patients (Knudsen et al., 2021; Yarborough et al., 2016).

A strength of this study is that the FOLIPRO is, to our knowledge, the first study carried out in real clinical practice with the same objectives comparing the three OAT options. A limitation of this study is the absence of information on the representativeness of the completed surveys received, given the large-scale distribution of invitations. We lacked precision regarding the total number of recipients to whom the participation survey was sent. Sending surveys by email could be influenced by external factors such as possible saturation of recipients' mailboxes, the email landing directly in the spam folder, as well as limitations related to the security of the health centre itself and the possibility of accessing the form on the centre's computers. It should also be noted that the study offered no type of incentive

for the participants, which may be considered a further limitation related to the number of surveys received. The very nature of the study and the exclusive use of surveys are other limitations. As in other studies based on surveys, responses have a strong subjective component and given this susceptibility, results should be read with caution before extrapolating to clinical practice. A further aspect to take into account is the failure to include clinical pharmacists among the professionals treating OUD patients. It would be interesting for future research to incorporate the views of pharmacists and their role, especially in the prison environment, and to carry out perception studies of HCP that combine quantitative and qualitative methodologies which also consider the perception and preferences of the OUD patient.

Conclusion

Based on the positive assessment offered by the HCP surveyed, PRB seems to be positioned as another alternative to the treatment of OUD alongside MTD and SL-BPN/NX. The reduced frequency of PRB administration thanks to the prolongation of the treatment effect could be beneficial in reducing the burden related to frequent collection of medication and could therefore also signify a reduction in the associated stigma, which could in turn improve treatment compliance and would achieve patient stabilization, thereby improving their quality of life.

Acknowledgements

The authors wish to thank the Spanish Scientific Society for Studies on Alcohol, Alcoholism and Other Drug Addictions (SOCIDROGALCOHOL), the Spanish Society of Dual Pathology (SEPD) and the Spanish Society of Prison Health (SESP) for their participation and support in the organization for carrying out the study.

Funding

The FOLIPRO study was funded by Camurus.

Conflict of interests

Carlos Roncero declares that he has received fees for lecturing for Janssen-Cilag, Indivior, Gilead, MSD, Exceltis, Abbvie, Takeda, Rubio, Casein-Recordati, Carnot, Angellini and Camurus. He has received financial compensation for serving as a consultant or board member for Lundbeck, Gilead, MSD, INDIVIOR, Exceltis, Camurus, Abbvie, Idorsia, Rovi and Recordati. He has carried out the PROTEUS project, funded by a grant from Indivior, and the COSTEDOPIA project, funded by INDIVIOR. He has also received two medical education scholarships from Gilead and Idorsia, as well as medical writing support from Abbvie.

Rodrigo Oraa Gil, Fracisco Pascual Pastor and Jose Joaquín Antón Basanta have received fees for lecturing for Camurus.

Diego Sucunza Guibert is employed by Camurus S.L, España.

María Yébenes Cortés and Miguel Ángel Casado are employees of Pharmacoeconomics & Outcomes Research Iberia (PORIB), an independent consultancy specialized in assessment of health interventions. For the development of this project, PORIB has received financing not conditional on results from Camurus S.L.

References

Andraka-Christou, B., Page, C., Schoebel, V., Buche, J. & Haffajee, R. L. (2022). Perceptions of buprenorphine barriers and efficacy among nurse practitioners and physician assistants. *Addiction science & clinical practice*, *17*(1), 43. https://doi.org/10.1186/s13722-022-00321-6

Andrilla, C. H. A., Jones, K. C. & Patterson, D. G. (2020). Prescribing practices of nurse practitioners and physician assistants waivered to prescribe buprenorphine and the barriers they experience prescribing buprenorphine. *The Journal of rural health: official journal of the American Rural Health Association and the National Rural Health Care Association, 36*(2), 187–195.

Bell, J. & Strang, J. (2020). Medication treatment of opioid use disorder. *Biological psychiatry, 87*(1), 82–88. https://doi.org/10.1016/j.biopsych.2019.06.020

Cioe, K., Biondi, B. E., Easly, R., Simard, A., Zheng, X. & Springer, S. A. (2020). A systematic review of patients' and providers' perspectives of medications for treatment of opioid use disorder. *Journal of substance abuse treatment, 119*, 108146. https://doi.org/10.1016/j.jsat.2020.108146

DeFlavio, J. R., Rolin, S. A., Nordstrom, B. R. & Kazal, L. A. Jr. (2015). Analysis of barriers to adoption of buprenorphine maintenance therapy by family physicians. *Rural and remote health, 15*, 3019. https://doi.org/10.22605/RRH3019

Dematteis, M., Auriacombe, M., D'Agnone, O., Somaini, L., Szerman, N., Littlewood, R., Alam, F., Alho, H., Benyamina, A., Bobes, J., Daulouede, J. P., Leonardi, C., Maremmani, I., Torrens, M., Walcher, S. & Soyka, M. (2017). Recommendations for buprenorphine and methadone therapy in opioid use disorder: A European consensus. *Expert opinion on pharmacotherapy*, *18*(18), 1987–1999. https://doi.org/10.1080/14656566.2017.1409722

European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) (2023). European Drug Report 2023: Trends and developments, https://www.emcdda.europa.eu/publications/european-drug-report/2023_en

European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) (2021). Opioids: health and social responses. Health and social responses to drug problems: A European guide. https://www.emcdda.europa.eu/publications/mini-guides/opioids-health-and-social-responses_en

Knudsen, H. K., Brown, R., Jacobson, N., Horst, J., Kim, J. S., Kim, H., Madden, L. M., Haram, E. & Molfenter, T. (2021). Prescribers' satisfaction with delivering medications for opioid use disorder. *Substance abuse treatment, prevention, and policy*, *16*(1), 78. https://doi.org/10.1186/s13011-021-00413-7

Lin, L. A., Lofwall, M. R., Walsh, S. L., Gordon, A. J. & Knudsen, H. K. (2018). Perceptions and practices addressing diversion among US buprenorphine prescribers. *Drug and alcohol dependence, 186*, 147–153. https://doi.org/10.1016/j.drugalcdep.2018.01.015

López-Briz, E. & Giner García, R. (2021). Buprenorfina subcutánea de liberación prolongada en el tratamiento de la dependencia a opiáceos. *Rev esp de drogodependencias, 46* (1), 104-109.

Louie, D. L., Assefa, M. T. & McGovern, M. P. (2019). Attitudes of primary care physicians toward prescribing buprenorphine: A narrative review. *BMC family practice, 20*(1), 157. https://doi.org/10.1186/s12875-019-1047-z

Marco, A., López-Burgos, A., García-Marcos, L., Gallego, C., Antón, J.J. & Errasti, A. (2013). ¿Es necesario disponer de tratamientos con Buprenorfina/Naloxona para los presos dependientes de opiáceos? *Rev Esp Sanid Penit, 15*, 105-113. ISSN 2013-6463.

Mendoza, S., Rivera-Cabrero, A. S. & Hansen, H. (2016). Shifting blame: Buprenorphine prescribers, addiction treatment, and prescription monitoring in middle-class America. *Transcultural psychiatry, 53*(4), 465–487. https://doi.org/10.1177/1363461516660884

Pascual, F. S., Muñoz, A., Oraa, R., Flórez, G., Notario, P., Seijo, P., Gonzalvo, B., Assaf, C., Gómez, M. & Casado, M. Á. (2022). Perception of a new prolonged-release buprenorphine formulation in patients with opioid use disorder: The PREDEPO study. *European addiction research*, *28*(2), 143–154. https://doi.org/10.1159/000520091

Pascual Pastor, F., Muñoz, Á., Oraa, R., Flórez, G., Notario, P., Seijo, P., Gonzalvo, B., Assaf, C., Gómez, M. & Casado, M. Á. (2023). Patients'satisfaction and experience in treatment with opioid substitution therapy in Spain. The PREDEPO study. Satisfacción y experiencia de pacientes en tratamiento con sustitutivos opioides en España. Estudio PREDEPO. *Adicciones, 35*(4), 433–444. http://dx.doi.org/10.20882/adicciones.1684

Roncero, C., Domínguez-Hernández, R., Díaz, T., Fernández, J. M., Forcada, R., Martínez, J. M., Seijo, P., Terán, A. & Oyagüez, I. (2015). Management of opioid-dependent patients: Comparison of the cost associated with use of buprenorphine/naloxone or methadone, and their interactions with concomitant treatments for infectious or psychiatric comorbidities. *Adicciones*, *27*(3), 179–189.

Roncero, C., Vega, P., Grau-López, L., Mesías, B., Barral, C., Basurte-Villamor, I., Rodríguez-Cintas, L., Martinez-Raga, J., Piqué, N., Casas, M. & Szerman, N. (2016). Relevant differences in perception and knowledge of professionals in different Spanish autonomous communities regarding availability of resources for patients with dual disorders. *Actas españolas de psiquiatria, 44*(1), 1–12.

Strang, J., Volkow, N. D., Degenhardt, L., Hickman, M., Johnson, K., Koob, G. F., Marshall, B. D. L., Tyndall, M. & Walsh, S. L. (2020). Opioid use disorder. *Nature reviews. Disease primers, 6*(1), 3. https://doi.org/10.1038/s41572-019-0137-5

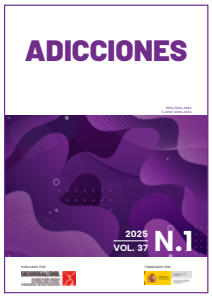
Suzuki, J., Connery, H. S., Ellison, T. V. & Renner, J. A. (2014). Preliminary survey of office-based opioid treatment practices and attitudes among psychiatrists never receiving buprenorphine training to those who received training during residency. *The American journal on addictions, 23*(6), 618–622. https://doi.org/10.1111/j.1521-0391.2014.12143.x

Vorspan, F., Hjelmström, P., Simon, N., Benyamina, A., Dervaux, A., Brousse, G., Jamain, T., Kosim, M. & Rolland, B. (2019). What place for prolonged-release buprenorphine depot-formulation Buvidal® in the treatment arsenal of opioid dependence? Insights from the French experience on buprenorphine. *Expert opinion on drug delivery, 16*(9), 907–914. https://doi.org/10.1080/17425247.2019.1649252

Yarborough, B. J., Stumbo, S. P., McCarty, D., Mertens, J., Weisner, C. & Green, C. A. (2016). Methadone, buprenorphine and preferences for opioid agonist treatment: A qualitative analysis. *Drug and alcohol dependence, 160*, 112–118. https://doi.org/10.1016/j.drugalcdep.2015.12.031

SOCIDROGALCOHOL
Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías

ADICCIONES
2025 ■ VOL. 37 ■ N. 1 ■ PAGES 85–88
www.adicciones.es



LETTER TO THE EDITOR

CBD products and their impact on urine toxicology analyses: Evidence from a six-case series

Productos con CBD y su impacto en los análisis toxicológicos de orina: Evidencia de una serie de 6 casos

Hugo López-Pelayo *,**; Noel Cabrera ***, Elsa Caballeria *; Maria Teresa Pons-Cabrera *,**; Juan Mena ***; Daniel Folch-Sánchez *; Naira Rico****; Jordi To-Figueras*****; Marina Parra-Robert*****; Mercè Balcells-Olivero *,**.

* Health and Addictions Research Group, Institut d'Investigacions Biomèdiques August Pi i Sunyer, University of Barcelona, Barcelona, Spain.

** Addictions Unit, Department of Psychiatry, Hospital Clínic de Barcelona, Catalunya, Spain.

*** Department of Psychiatry, Hospital Clínic de Barcelona, Catalunya, Spain.

**** Core Laboratory, Service of Biochemistry and Molecular Genetics, Biomedical Diagnostic Center (CDB), Hospital Clínic of Barcelona, University of Barcelona, Barcelona, Spain.

***** Pharmacology and Toxicology Laboratory, Service of Biochemistry and Molecular Genetics, Biomedical Diagnostic Center (CDB), Hospital Clínic of Barcelona, University of Barcelona, Barcelona, Spain.

In Spain, daily or almost daily cannabis use has a prevalence of around 3.7%, making Spain one of the three countries in the European Union with the highest use in this risk pattern (Manthey et al., 2021). The plant from which cannabis consumer products are derived has around 500 components, of which more than 40 are cannabinoids. The main cannabinoids are delta-9-tetrahydrocannabinol (THC) - the psychoactive component in the highest quantity - and cannabidiol (CBD) (Casajuana Kögel et al., 2018). Recently, the use of cannabis derivatives with low THC content (<0.2%) and high CBD content (at times higher than 10%) has become popular, since they are sold within an ambiguous legal framework and offered as a less harmful, sometimes even healthy alternative, despite the lack of scientific evidence. Researchers and healthcare professionals are wondering whether the use of these products can lead to positive results in routine urine THC tests, given that they contain a minimal dose of THC (<0.2%, according to the labels).

We conducted a clinical and analytical study of the THC metabolite (11-nor-9-carboxy-delta-9-THC) with six healthy volunteers. These six researchers smoked a standard joint (Casajuana Kögel et al., 2017) with high CBD and low THC content, according to the label (<0.2% THC); three of them had the "weed" equivalent format ("Remedy" variety, CBD <13%) and the other three the "hashish" equivalent ("Ketama" variety, CBD<15%). Per protocol, it was ensured that no participant had a history of substance use disorder, a personal or family history of serious mental disorder, or any medical illness. All participants were of legal age (age range: 27 – 39), two were women (non-lactating and non-pregnant) and four were men, and all freely gave their consent. The product was purchased from a specialized CBD store. None of

■ *Received: April 2024; Accepted: July 2024.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Daniel Folch-Sánchez. Health and Addictions Research Group, Institut d'Investigacions Biomèdiques August Pi i Sunyer, University of Barcelona.
Email: dfolch@recerca.clinic.cat

the participants presented psychoactive effects. The only adverse effect detected was one user's self-limiting irritating cough and mild dizziness, probably related to the route of administration, the user not being a regular smoker. Twelve hours after smoking, each participant provided a urine sample that was sent to the laboratory for routine analysis of the THC metabolite by immunoassay screening (Atellica Solutions, Siemens Healthineers) followed by confirmatory analysis performed by gas chromatography-mass spectrometry (GC-MS) (Agilent Technologies). The results in all six cases and for both types of analysis were negative.

Cannabis use is contraindicated in certain pathologies (such as schizophrenia, COPD, etc.), conditions (pregnancy, breastfeeding, driving, etc.) or circumstances (alternative penal measures, transplant evaluation processes, prisons, etc.) (Kriss et al., 2024; Petrilli et al., 2022; Solmi et al., 2023). This may lead some regular cannabis users to look for alternatives they consider less harmful and which, at the same time, do not prove positive in urine tests; for example, anxiolytic or hypnotic effects without other psychoactive effects are sought after, beyond the limited scientific evidence available regarding such effects. Given the lack of knowledge about the effects of the low THC content of these products and their detectability by routine cannabis analysis, which may have implications for certain populations (pregnancy, breastfeeding, driving or other legally regulated circumstances), studies are needed to clarify the safety and adverse effects of cannabidiol use, as well as its impact on toxicological studies.

To our knowledge, this is the first study of its kind. However, other groups have already warned of CBD products being accidentally contaminated with THC and even heavy metals or pesticides. Some CBD samples could thus have higher THC concentrations than stated on the label. Of particular concern is the online purchase of such products due to the risk of fraud (Bonn-Miller et al., 2017; Gidal et al., 2024; Johnson et al., 2022; Liebling et al., 2022). A helpful simile in understanding the knowledge gap would be the differentiation between non-alcoholic beers (up to 1.2% alcohol) and 0.0 beers (up to 0.04% alcohol) where the limits are clear. While the former has clinical and toxicological implications, the second type of beer is less relevant at these levels. Currently, we do not know if the CBD products on the market are more like "0.0" or "non-alcoholic" beers, or even if, in some cases, they could be beers with the usual amount of alcohol and labelling errors.

Our study has some limitations. Firstly, the detectability of the THC metabolite was only analysed in a reduced intake. Furthermore, we have only used two types of samples from a single supplier. Our sample size is small. Finally, we have not analysed other psychoactive cannabinoids such as delta-8-tetrahydrocannabinol (La Maida et al., 2022).

We can conclude that, for this specific batch from this specific producer, the use of CBD with a low percentage of THC is not detectable in urine with screening laboratory analyses nor confirmatory for cannabis. There is a need for studies which investigate different suppliers and batches, as well as different sales environments (cannabis user associations, black market, specific CBD stores, online products, etc.) so that users can be correctly informed about the risks associated with the use of available products with CBD and low THC content, including those related to forensic studies or medical evaluations.

Conflict of interests

MJM has received medical education and training courses support from Rovi, Janssen-Cilag and Casen Recordati and travel support from Rovi.

HLP has received training grants from Lundbeck and Advanz (non-related to this work).

References

Bonn-Miller, M. O., Loflin, M. J. E., Thomas, B. F., Marcu, J. P., Hyke, T. & Vandrey, R. (2017). Labeling Accuracy of Cannabidiol Extracts Sold Online. *JAMA*, *318*(17), 1708–1709. https://doi.org/10.1001/JAMA.2017.11909

Casajuana Kögel, C., Balcells-Olivero, M. M., López-Pelayo, H., Miquel, L., Teixidó, L., Colom, J., Nutt, D. J., Rehm, J. & Gual, A. (2017). The Standard Joint Unit. *Drug and Alcohol Dependence*, *176*(March), 109–116. https://doi.org/10.1016/j.drugalcdep.2017.03.010

Casajuana Kögel, C., López-Pelayo, H., Balcells-Olivero, M. M., Colom, J. & Gual, A. (2018). Psychoactive constituents of cannabis and their clinical implications: A systematic review. *Adicciones*, *30*(2). https://doi.org/10.20882/adicciones.858

Gidal, B. E., Vandrey, R., Wallin, C., Callan, S., Sutton, A., Saurer, T. B., Triemstra, J. L., Fröhlich, E., Ramirez, C. & Leas, E. (2024). Product labeling accuracy and contamination analysis of commercially available cannabidiol product samples. *Frontiers in Pharmacology*, *15*, 1335441. https://doi.org/10.3389/FPHAR.2024.1335441

Johnson, E., Kilgore, M. & Babalonis, S. (2022). Cannabidiol (CBD) product contamination: Quantitative analysis of Δ9-tetrahydrocannabinol (Δ9-THC) concentrations found in commercially available CBD products. *Drug and Alcohol Dependence*, *237*, 109522. https://doi.org/10.1016/J.DRUGALCDEP.2022.109522

Kriss, M., Shingina, A., Hamel, S. & Winder, G. S. (2024). Cannabis use in liver transplant candidates and recipients. *Liver Transplantation*. https://doi.org/10.1097/LVT.0000000000000335

La Maida, N., Di Giorgi, A., Pichini, S., Busardò, F. P. & Huestis, M. A. (2022). Recent challenges and trends in forensic analysis: Δ9-THC isomers pharmacology, toxicology and analysis. *Journal of Pharmaceutical and Biomedical Analysis*, *220*, 114987. https://doi.org/10.1016/J.JPBA.2022.114987

Liebling, J. P., Clarkson, N. J., Gibbs, B. W., Yates, A. S. & O'Sullivan, S. E. (2022). An Analysis of Over-the-Counter Cannabidiol Products in the United Kingdom. *Cannabis and Cannabinoid Research*, *7*(2), 207. https://doi.org/10.1089/CAN.2019.0078

Manthey, J., Freeman, T. P., Kilian, C., López-Pelayo, H. & Rehm, J. (2021). Public health monitoring of cannabis use in Europe: Prevalence of use, cannabis potency, and treatment rates. *The Lancet Regional Health - Europe*, *10*, 100227. https://doi.org/10.1016/J.LANEPE.2021.100227/ATTACHMENT/92A316F9-6946-45B4-B4E1-4EB-58C208B96/MMC2.ZIP

Petrilli, K., Ofori, S., Hines, L., Taylor, G., Adams, S. & Freeman, T. P. (2022). Association of cannabis potency with mental ill health and addiction: A systematic review. *The Lancet. Psychiatry*, *9*(9), 736–750. https://doi.org/10.1016/S2215-0366(22)00161-4

Solmi, M., De Toffol, M., Kim, J. Y., Choi, M. J., Stubbs, B., Thompson, T., Firth, J., Miola, A., Croatto, G., Baggio, F., Michelon, S., Ballan, L., Gerdle, B., Monaco, F., Simonato, P., Scocco, P., Ricca, V., Castellini, G., Fornaro, M.,… Dragioti, E. (2023). Balancing risks and benefits of cannabis use: Umbrella review of meta-analyses of randomised controlled trials and observational studies. *BMJ (Clinical Research Ed.)*, *382*. https://doi.org/10.1136/BMJ-2022-072348

AUTHOR GUIDELINES

Adicciones is published by ***Socidrogalcohol*** *(Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y otras Toxicomanías*; Spanish Society for Studies on Alcohol, Alcoholism and other Drug Addictions).

Adicciones publishes original articles on treatment, prevention, policy, basic studies and descriptive studies in the field of addictions, including those to illegal drugs, alcohol and tobacco and any other addiction, and originating from various disciplines (medicine, psychology, basic research, social research, etc.). All articles are selected after undergoing an anonymous review process by experts on each topic.

Adicciones publishes four issues per year in March, June, September and December. The journal has the following sections: Editorial, original articles, brief reports, review articles and letters to the Editor.

1. GENERAL DESCRIPTION

Languages

The journal accepts articles in Spanish and in English. The final edition of the articles will be published in both languages.

Conflicts of interest and Ethical Guidelines

The journal's policy is that all articles and editorials expressly state whether or not there are conflicts of interest in the corresponding section. All conflicts of interest are important, but particular care should be taken in cases of having received funding for the study from the pharmaceuticals, drinks or tobacco industries, or comparable sources. The existence of a conflict of interests does not mean the article cannot be published. In cases of doubt over this issue, please contact the Editorial Board.

In this regard *Adicciones* follows the recommendations and the Ethical Guidelines of the ISAJE (*International Society of Addiction Journals Editors*): **https://www.isaje.net/ethical-guidelines.html**

Authorship.

The articles must be original. It is very important to consider as authors only those who have made substantial contributions: 1) to the conception and design, data collection, or analysis and interpretation of data; 2) to the writing of the article or its critical review; and who have given their approval to the version submitted for publication.

All manuscripts will be evaluated with plagiarism control tools. The authors should ensure that significant portions of the material have not been published previously. In case of doubt about the fulfilment of this requirement, copies should be provided of the material in question previously published or submitted elsewhere before the article can be considered for review.

Any further doubts about these aspects can be clarified by consulting the *Farmington Consensus*, to which *Adicciones* subscribes: **https://www.isaje.net/farmington-consensus.html** or the publication rules of the American Psychological Association, 7th edition (2020).

2. PREPARATION OF MANUSCRIPTS

Authors should exclusively follow the Publication Guidelines of the American Psychological Association, 7th edition (2020) (**www.apastyle.org**).

Adicciones respects and encourages diversity. Authors should use inclusive language that is free of bias and stereotypes. There is NO precise limit on the number of words for articles submitted. However, great care should be taken to include only the information that is strictly necessary. It is important for articles to be of interest to the scientific community in the field of addictions. Authors should refrain from submitting articles referring to highly specific aspects – unless that is precisely their interesting feature – or that are basically descriptive – unless they deal with a novel issue. It is recommended that manuscript preparation follow the guidelines for research in addictions from the ISAJE: **https://www.isaje.net/reporting-guidelines.html** and the Equator network https://www.equator-network.org/

Types of articles

Original Articles

These will preferably be works on clinical or experimental research in the field of drug dependence or addictions. Empirical manuscripts with large samples and solid methodologies will be especially valued.

Review Articles

Review articles should serve to update an issue in rigorous and exhaustive fashion. hese reviews should be governed by systematized methods (e.g., PRISMA criteria) and be registered in review protocol databases (e.g., PROSPERO).

Letters to the Editor

These will normally have a maximum of 800 words, 10 references and a table or figure. They may consist in a brief presentation on a new issue, an original research study, or a reply or comment in relation to an article published in the journal. In this last case the letter should arrive normally within the 6 weeks following publication of the article in the journal.

3. SUBMISSION PROCESS

All articles should be submitted through www.adicciones.es. In the platform it could be find all the instructions for manuscripts preparation and for submission. All the follow-up of the review and editorial process will be done through the web platform of Revista Adicciones. All authors and co-authors must be registered in the journal's platform and their contact information (e.g., e-mail and telephone) must be indicated in the first step of the submission to initiate the process. This is the only way to send articles (if you have any doubts or technical problems, please contact **revistaadicciones@socidrogalcohol.org**).

Structure of the works submitted to the Journal

The following documents must be prepared and attached for the submission of manuscripts:

A) *Cover Letter.* It should contain the purpose of the work, the rationale for why it was conducted and what contribution makes to already-existing knowledge, the potential audience for the study findings and the implications for the development of potential new works, and how the main findings of the study contribute to the development of new knowledge in the field of addictions.

B) *Authorization document from all authors.* All manuscripts submitted for consideration for publication in Adicciones will be accompanied by a letter signed by all authors. This document will state that:

1. The manuscript is original and has not been published previously, in whole or part, nor is it being considered for publication in another journal.
2. The funding that the study has received (direct or indirect) and whether it has connections with the tobacco, alcohol or pharmaceutical industry, or other relationships that could result in a conflict of interest.
3. That the manuscript has been written, read, and approved by the authors as submitted, and that authorship corresponds to all signatories.
4. That all ethical principles have been complied with in relation to the protection of persons or patients, or animals, when animal experimentation is involved.
5. That all the corresponding permissions to reproduce previously published material to be included in the manuscript, such as text, tables, figures, etc., are attached.
6. That correspondence concerning the manuscript submitted for publication will be handled by the corresponding author whose name, address, telephone number and e-mail address will be indicated. At the same time, this author will be responsible for contacting the other authors to request review and final approval of the article.
7. That the copyright of the article will be transferred to Adicciones in case it is published in the journal Adicciones.
8. The policy of the journal Adicciones is to disseminate its articles, thus authors can send their published articles to other people in electronic format. The reproduction and commercial dissemination of the journal's articles is restricted by copyright and requires permission from the journal.

C) *Tittle Page.* On the first page of the article the following information will appear, in the order as stated:

- Title of the article, in lower case (in Spanish and English), except initial letter.
- Authors' full forenames (not initials only), and one or two surnames (e.g.: Miguel García or Miguel García Rodríguez, or even Miguel García-Rodríguez, bearing in mind that the way in which the name appears is how it will be sent to the databases) in lower case, except for the first letter. The different authors' names will be separated by semicolons. After each author's surname, without an intervening space and in superscript, there should be an asterisk (1 for the first, 2 for the second, etc.). These asterisks are necessary for indicating the institution at which the work has been carried out (see following point).
- Preceded by one or more asterisks, as applicable (see previous point), the names of the institution(s) where the work has been carried out or where the authors work will be indicated.
- At the bottom of the first page (not as a footnote), the following text will appear: "Send correspondence to: ...", indicating the name and postal address, e-mail or other contact information. This is the author with which the secretary will correspond during the review process, unless other arrangements are made by mutual agreement.

D) *Manuscript.* All pages should be numbered consecutively at top right. The order of presentation followed in the manuscript will be as follows:

1. The first page of the manuscript should indicate:
   - Title of the article, in lower case (in Spanish and English), except initial letter.

2. The second page of the article will include:
   - An abstract in both Spanish and English, of between 120 and 250 words in length. Following the international publication rules set out above, the abstract should specify the objectives of the study or research, the basic methodology employed, the main results, and the most important and/or novel conclusions.The *abstract* should be written in one or more paragraphs according to the APA publication rules, *but not divided into antecedents, method, etc.*
   - The abstract will be followed by a list of around 5 *Key words*, first in Spanish and then in English, in lower case and separated by commas. Where possible, these words should be in line with those normally used in well-known indices (e.g., Mesh terms).

3. The article proper will begin on the third page. Review process will be anonymous, confidential and blinded, it is recommended that the authors delete any information that they consider could help to identify them, such as, for example, place of selection of participants, institution of membership of the Ethics Committee that has approved the study, etc. This information can be concealed by replacing it with the expression "[AUTHORS]" or similar. It is recommended for articles to be written in the passive voice, where appropriate. The text should be clearly divided into sections, following – as far as possible depending on the characteristics of the study – the general scheme: **Introduction** (though the word should not appear as a heading), **Method, Results, Discussion, Acknowledgements, Conflict of interests** and **References**.

Introduction

This section should be relatively brief, but provide the necessary and introductory explanation so that readers can understand the state of the issue prior to the research, and so that they can see the need for such research and how it was approached. This section should not include tables or figures, unless they are essential to the understanding of the text. It should include a final paragraph setting out clearly the objective(s) of the work.

Method

This section should clearly describe the methodology employed (selection of the sample, collection of data, data-collection or assessment instruments, timeframe, etc.). It should also identify the methods, assessment instruments, treatments, drugs used, apparatus, assessment system, statistical methods where they are new, new types of method, and so on. The author should specify the type of study (descriptive, epidemiological, experimental, clinical trial, etc.), system of assignment of participants to groups, randomization, etc. All submissions should indicate the reference of the Ethics Committee or Research Office which has approved the adequacy of this research to the corresponding ethical and legal framework. It is important that experimental studies and clinical trials are registered and the registration number is indicated in the trials database (e.g., **Clinicaltrials.gov**). Authors should state the type of statistical analysis used, describe it where it is new or little known, and indicate the statistics package employed. It is strongly recommended to indicate, when possible, the exact significance data obtained in the results (as opposed to formulas such as $p < .05$ or $p < .01$) as well as to include, also when possible, effect size statistics.

Results

The results should be presented in a logical sequence with regard to text, tables and figures. Use only those tables and figures that are strictly necessary, that clearly express the results of the study. Do not duplicate data in tables and figures. Do not repeat in the text all the data from the tables and figures, only the most important. Emphasize and summarize only the most important observations. ***Adicciones*** adopts the conventional system of 5% as the value for statistical significance, and does not accept the consideration of trends with lower values.

Randomized clinical trials should follow the CONSORT guidelines (**www.consort-statement.org**) and studies with non-experimental designs should follow international guidelines (e.g.,STROBE **https://www.strobe-statement.org/**), to provide greater clarity for readers and reviewers. Likewise, effect size statistics will be presented.

Discussion

It is necessary to start with the general objective of the study. This section will emphasize the novel and important aspects of the study and the conclusions deriving from it. It should not repeat in detail the results presented in either the previous section or the introduction. The discussion should highlight the most important and controversial aspects and relate them to other relevant studies on the matter. Do not make assumptions if they are not supported by the data. Where appropriate, this section can include recommendations. Indicate the implications of the study's findings and its limitations (these will preferably be contained in a paragraph at the end of the article).

Acknowledgements

This section will be situated after the end of the article proper, and just before the **Conflicts of interest**. Where considered necessary, it will include the names of persons, institutions or bodies that have collaborated with or supported the research. It may include mention of those people who have helped in the preparation of the article, but not with the intensity required for being considered as authors. Sources of funding, call for proposals and reference of such funding, indicating whether it is competitive or not, should also be indicated here.

Conflicts of interest.

All articles, editorials, comments, opinions, book reviews and letters published in the journal will be accompanied by a declaration about possible or actual conflicts of interest or a statement to the effect that the authors have no conflicts of interest to declare.

References

These will follow strictly the norms of the American Psychological Association [American Psychological Association (2020). *Publication Manual of the American Psychological Association* (7th ed.). Washington, DC. **http://www.apastyle.org**

Tables and Figures

These will appear at the end of the text, numbered, and each one on a different page. The place where they should be placed should be indicated in the text of the manuscript. Both tables and figures should be submitted in a format that can be modified during the article editing process.

Data management and supplementary material

Addicciones is an open Access journal, and therefore committed to open science. Authors are encouraged to share datasets used in research work and supplementary material in open access institutional or thematic repositories, federated in the European Open Science Cloud (EOSC). This will allow data to be findable, accessible, interoperable and reusable in accordance with FAIR principles. In the case of having datasets or materials in any repository, the web links to these files or data as well as the permissions and conditions of use of these data must be provided. These links will be included in a section of the journal entitled "Data management and supplementary material". The supplementary material will be reviewed by the journal's editorial board. After publication this material cannot be modified, and a copy will be registered in the journal itself. Authors may request that the material be published on the journal's platform as well.

4. MANUSCRIPT REVIEW PROCESS

Articles are submitted to the journal via **www.adicciones.es**. Authors and other co-authors must register in the journal's web platform in order to submit their manuscripts. On submitting the manuscript, authors receive a code for accessing the web and checking the situation of their article. However, the Editor will send them a message once a decision has been made or there is a need to query some matter. Once the manuscript has been received by the journal's offices, the review process will begin.

The entire process of receiving and submitting articles follows a blind process controlled by the Editor-in-Chief. The Editor can reject an article immediately after its submission if it is not felt to be of sufficient quality or of priority interest for the journal.

All manuscripts, in order to be considered for publication in *Adicciones*, should adhere strictly to the publication rules of the journal (which are those of the APA). The Editor reserves the right to reject immediately (without progression to the review stage) those articles that fail to meet this requirement.

During the submission process, authors will be asked to provide the name of at least two possible reviewers for their article (name, institution, e-mail and ORCID). The proposed reviewers must be experts in the topic and not be linked to the research being developed in the submitted work. They should not belong to the current Editorial Board of Adicciones. The journal reserves the right to decide whether or not to use these proposed reviewers.

Manuscripts shall be sent by the Editor to two or more experts in the field (reviewers), who will make the pertinent comments and recommend the changes they deem necessary; they may also give their opinion as to the acceptance or rejection of the article. The final decision, based on the report from the reviewers, will be taken by the Editor of the journal. The review process will be "double blind". Throughout the review process the principle of confidentiality will be maintained by the reviewers towards the work they review, as well as the confidentiality of the names of the reviewers among themselves or to the authors of the manuscript. In this sense, the reviews will be anonymous, confidential and blind also for the reviewers, who will not know the names of the authors at any time.

The result of the manuscript review will be sent to the corresponding author, indicating its acceptance or rejection or the need for a new review once the author has taken into account all the comments by the reviewers and the Editor. Authors must make all the changes indicated as soon as possible (unless otherwise indicated the period will be two months, though this may be extended subject to justification by the authors) via the journal's electronic management system, sending:

- A copy of the final manuscript
- A copy of the revised manuscript.
- Another document setting out in detail the principal modifications made, together with authors' own comments on the main aspects of the review.

5. PUBLICATION PROCESS

Once the article has been accepted, the following procedure will be followed:

1. 1. The authors will receive a version with possible format and style corrections, to which they must respond within a maximum of 10 days.

2. 2. After receiving a reply from the authors, they will be informed of the estimated number of pages that will comprise the final version of the article, along with the article process charges.
3. 3. Once payment has been received, the article will be translated into English or Spanish, depending on the original language of the article.
4. 4. A final document or galley proof will be generated, which the authors must also review.
5. 5. A DOI will be assigned to the work and it will be published in advance online, until pages are assigned within a specific volume in which the manuscripts will finally be published.

In the case that authors share their papers in pre-print and post-print servers, and if the manuscripts are accepted for publication in the journal Adicciones, they should indicate that the final version of these documents can be found on the journal's website, adding the corresponding link to their article.

Authors are fully responsible for the final published version. The opinions expressed in the Adicciones journal are not necessarily those of the Government Delegation for the National on Drug Plan, the Spanish Ministry of Health or Socidrogalcohol. The authors are free to distribute the article, as long as all pertinent information about the journal in which it was published is clearly stated. In the event that the authors would like to propose any modification or rectification, once the articles have been published, they should communicate it to the journal's editors. In addition, the journal reserves the right to accept such changes or to withdraw any publication that may contain erroneous information or the result of research misconduct.

Publication fees

The journal Adicciones is Open Access, which means that once published, the articles will be freely available on the web and other search platforms, allowing them to be sent and shared with the entire scientific community. This means that a number of expenses for editing, layout and distribution rights must be covered by the authors. The Open Access publication process complies with the requirements and recommendations established by the most recent calls for scientific funding such as Horizon 2020 and the Science Act of the Spanish Ministry of Science and Innovation, which promote open access to science.

The publication of new articles is subject to the payment of 50€ per printed page (VAT included) with a 30% discount if first author is a member of Socidrogalcohol. For those cases in which at least 50% of the authors belonging to developing countries (according to **World Bank**) will pay half the listed price. Exceptionally, when dealing with high quality articles, publication fees might be negotiated if facing serious economic problems.

6. COPYRIGHT

All copyright rights for articles published in Adicciones will be transferred to the journal. Manuscripts may be submitted to and included in public and institutional repositories as long as they include a link to the manuscript published in the journal, the correct citation, and permission from the editor.

The authors agree to include in the manuscript all necessary permissions to reproduce previously published material, such as text, tables or figures.

Privacy Statement

Names and email addresses entered in this website will be used exclusively for the stated purposes of this journal and will not be made available for any other purpose or to any other party.

2025 ■ VOL. 37 ■ N. 1
ADICCIONES

EDITORIAL

ORIGINALS / ORIGINALES

LETTER TO THE EDITOR / CARTA AL EDITOR

PUBLISHED BY:
SOCIDROGALCOHOL
Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías

FUNDED BY:
MINISTERIO DE SANIDAD
SECRETARÍA DE ESTADO DE SANIDAD
DELEGACIÓN DEL GOBIERNO PARA EL PLAN NACIONAL SOBRE DROGAS