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).

2024 ■ VOL. 36 ■ N. 2
ADICCIONES

INDEX / ÍNDICE

EDITORIAL

ORIGINALS / ORIGINALES

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 2024

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* .....

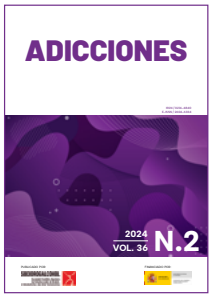
Atentamente (firma del titular)

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
2024 ■ VOL. 36 ■ N. 2 ■ PAGES 121–128
www.adicciones.es



EDITORIAL

On suicidal behaviour and addictive behaviours

Sobre la conducta suicida y las conductas adictivas

Eduardo Fonseca-Pedrero*, Susana Al-Halabí**.

* Universidad de La Rioja.
** Universidad de Oviedo.

Suicidal behaviour is a multifaceted phenomenon, the delimitation, assessment, prevention, intervention and postvention of which requires a comprehensive approach focused on the individual's suffering and biographical context (Al-Halabí & Fonseca-Pedrero, 2021). Suicidal behaviour includes complex phenomena such as ideation, planning, communication, attempt and death by suicide, thus encompassing the set of thoughts and behaviours related to intentionally taking one's own life (Fonseca Pedrero et al., 2022; Jobes et al., 2024; Turecki et al., 2019).

The impact of both suicidal and addictive behaviours at personal, family, school, work, social and health levels is evident. At 4,227 in 2022, the number of suicide deaths in Spain was 5.6% higher than the previous year. In the last decade, more than 36,000 people have died by suicide in Spain (National Institute of Statistics [INE], 2023). The World Health Organisation [WHO] (2014) estimate of an average of 20 suicide attempts per death by suicide would mean almost 85,000 suicide attempts per year in Spain. The drama this perspective implies is difficult to describe and cope with for family members and friends who, at times, may find themselves faced with a complex grieving process (Al-Halabí & Fonseca-Pedrero, 2023). According to Coppersmith et al. (2023), approximately 9% of the population has reported suicidal thoughts at some point in their lives, and 4.9% of Spanish adolescents said that they had tried to take their own life at some point (Fonseca-Pedrero et al., 2023). The data are there, they speak for themselves. The present and future social cost of inaction is (or will be) even greater, however (McDaid et al., 2021).

Regarding addictions, the human and social cost is also very high, to which are added the related costs for the public care system (prevention, medical care and treatment), public safety, the environment and work productivity. Additionally, substance abuse can impact the lives of people around the user, especially in their family. A strong link has been observed between domestic violence and substance abuse, in particular risky drinking. However, the impact depends on a series of factors, including the type and frequency of

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Eduardo Fonseca Pedrero. University of La Rioja. C/ Luis de Ulloa, s/n, Edificio VIVES; C.P: 26002, Logroño, La Rioja, Spain. Tel: +34 941 299 031. Fax: +34 941 299 333. Email: eduardo.fonseca@unirioja.es

the substance used and the social environment (Ministry of Health, Social Services and Equality, 2017).

Back to basics: from diagnostic labels to understanding the person-in-the-world

Suicidal behaviour is characterised by the presence of immense vital suffering and intolerable psychological pain which feels unsolvable, endless, inescapable, without a future or hope, which leads a person, in given circumstances, to decide to take their own life (Al-Halabí & Fonseca-Pedrero, 2023; Chiles et al., 2019).

This new perspective conceives suicidal behaviour as an existential drama, a way of responding to and coping with the various vicissitudes of life (García-Haro et al., 2023). The various manifestations of suicidal behaviour constitute neither pathognomonic signs or symptoms of a supposed (and misnamed) "mental illness" nor an "intrapsychic breakdown" that would have to be "cured." Such phenomena are radically (at root) psychological, and their true meaning can only be understood by considering the individual who experiences them subjectively, based on their biographical context (Pérez-Álvarez, 2018). Note that no reality is denied here, neither biological nor social; the focus is simply shifted to the narrative and relational arc of the individual.

No matter how much the opposite is asserted, and before beginning a new illusory and fruitless search for the "suicidal" or "addict brain," it is worth remembering that it is difficult to take the inherent phenomenological and contextual nature of human experiences out of the equation. The focus should not be on the mere description of psychopathological symptoms, devoid of context and function, like a recipe book of symptoms from the Diagnostic and Statistical Manual of Mental Disorders, but rather on understanding the experience lived by the person. Ignoring the fragmented and existential narrative of suffering carries far-reaching implications. It may lead, for example, to interventions that, despite seeming technically appropriate, not only do not alleviate suffering, but become a source of suffering in themselves with possible side effects.

Against the grain: the chimera of risk prediction and cause in supposed underlying mental disorders

The field of knowledge and research on suicidal behaviour is changing. We are witnessing a reform which attempts to avoid the perpetuation of myths and practices anchored in a traditional model that decrees: a) the best way to prevent or reduce suicide is through risk prediction; and b) the majority of people who attempt suicide do so as a result of some mental disorder [see, for example, substance use disorder (SUD)], ergo the solution is to treat the underlying disorder.

Firstly, suicidal behaviour is plural/diverse, dynamic/fluctuating/interactive, extraordinarily variable over time and highly dependent on contextual elements (Kleiman et al., 2017), an aspect which it has in common with addictive behaviours (Dowling et al. al., 2023; Ross et al., 2017). Previous studies have found that 95% of those classified as "high risk" did not actually commit suicide, while half of suicide deaths occurred in people classified as "low risk" (Large et al., 2017). Prestigious publications emphasise that suicide risk prediction has no validity or usefulness, so continuing to rely on it as a prevention strategy is a chimerical equation leading only to insurmountable frustration for both professionals and people seeking help (Hawton et al., 2022).

Secondly, although the presence of a mental disorder and suicidal behaviour may correlate, the diagnosis is never the cause (García-Haro et al., 2020), nor does it explain why a person thinks about or attempts to commit suicide, nor does it consider the dilemmatic contexts or situations where death is contemplated as a solution. Reducing the suicidal act to a mere involuntary symptom of another diagnostic label (SUD, for example) or to a correlate of drug use implies a distortion of its most essential meaning, which is the intentionality-of-wanting-to-take-your-life (García-Haro et al., 2020) in conjunction with an ethical dimension woven into the person's values. It is time to move from a culture focused on the "symptom" to one based on the "functional understanding of the reasons." We should remember that no one tries to end their life without a reason.

Assessment: from the third to the first person

The interview is an indispensable and irreplaceable technique in which not only psychological assessment forms an essential part of the treatment approach, but also comprehension, validation and empathic responsiveness as part of a collaborative and therapeutic relationship. In the field of suicidal behaviour, the interview is understood as an active part of the process of treatment or decision-making (Al-Halabí & Fonseca-Pedrero, 2023). In addition to topographic-diagnostic aspects, the professional must thus consider the person-centred experiential perspective. That is, going beyond supposedly "objective" or descriptive data in an attempt to understand the individual's subjective experience or perspective, their way of being in the world, and their personal narrative.

Beyond the relevance, representativeness and adequacy of the items (Kreitchmann et al., 2024), pencil and paper tests and scales (e.g., Al-Halabí et al., 2016) must necessarily be combined with the professional's judgment

and therapeutic skills, and a balance between the desire for help and respect for autonomy, as well as the values and characteristics of the person seeking help. Given that the predictive capacity of tests is poor, thus providing a false sense of security, health professionals must address individual circumstances, strengths and characteristics. The assessment should address the person's needs and how to meet them in the short and long term. Building the clinical narrative in this way will ensure that full attention is paid to the person and that they are guided towards the best personalised treatment, rather than the assessment being an end in itself (National Institute for Health and Care Excellence [NICE], 2022). As noted by Mughal et al. (2023), moving from a "risk-focused" to a "safety-focused" culture is a challenge for everyone, particularly for public services. It should thus be about not only knowing how to assess, but also about offering an empathetic understanding of the person in crisis and their problem so that they can regulate their emotions and consider possible alternative solutions (Al-Halabí et al., 2023). Only through an assessment process that validates emotional pain and establishes a therapeutic alliance (Fartacek et al., 2023; Huggett et al., 2022) can the professional intervene on those aspects that can mitigate the pain or those that are modifiable through appropriate psychological treatment, which would include substance use (Hawton et al., 2022). Separating assessment and intervention with people with suicidal behaviour and substance use is not only impossible but counterproductive.

Preventing suicidal behaviour: in search of empirical support and social determinants

The fact that suicide is preventable has been highlighted by the available empirical evidence. Effective intervention strategies and resources for prevention are available (Mann et al., 2021; Pirkis et al, 2023; Zalsman et al., 2016). Indeed, the literature shows that suicide deaths can be prevented with timely, evidence-based and often low-cost interventions (Platt et al., 2019; Wasserman, 2021).

It is essential to implement universal, selective and indicated strategies which are efficacious, effective and efficient in reducing or mitigating the global burden, as well as the associated disability and morbidity, and which, ultimately, help improve the quality of life in the present and future society. With this in mind, the WHO has developed the LIVE LIFE approach (Pan American Health Organisation, 2021) for suicide prevention, in which the following evidence-based strategies are recommended: a) limit access to means of suicide (e.g., pesticides, firearms, certain drugs); b) interact with the media to responsibly report on suicide; c) promote socio-emotional skills and life skills in adolescents; and d) identify, assess, manage and monitor people exhibiting suicidal behaviour who come into contact with public administration systems, whether health or social.

Prevention must include a clinical, educational and community approach. Every professional, institution, association, government, etc., has a crucial role to play. Being multisectoral and multilevel, the prevention of suicidal behaviour is not supported only, nor primarily, by mental health services. Homeless people, who, as described in the literature usually present high rates of SUD and suicidal behaviour, serve as an example (Calvo et al., 2023). In Spain, only one longitudinal study has been carried out in this population (Calvo et al., 2024). According to the authors of the study, the rate of death by suicide among homeless people was 700 times higher than in the general Spanish population (INE, 2023). The percentage of those attempting suicide on some occasion was 84 times higher than the population in international publications (Turecki et al., 2019). Another community and social example can be found in the results that support suicide prevention in educational centres (Walsh et al., 2022). Thus, active interventions, compared to controls, were associated with a lower likelihood of 13% for ideation (Odds Ratio (OR) = 0.87, 95% CI [0.78, 0.96]) and 34% for suicide attempts (OR = 0.66, 95% CI [0.47, 0.91]). This is not a minor issue, since many suicidal behaviour prevention programs have components in common with substance use prevention programs, such as conflict resolution or social skills (González-Roz et al., 2023). Likewise, both self-harming and addictive behaviours can share aspects of self-regulation when experiencing conflict, particularly in adolescents (Eslava et al., 2023). Furthermore, prevention programs can result in "cross-effects," differentially impacting both types of behaviour (Ayer et al., 2022).

Reviving a model based on salutogenesis, understood as the ability to benefit from positive environmental influences, would not be a bad idea either. Focusing on strengths and opportunities serves to remind society that families and communities are its greatest assets, something that has often been ignored or forgotten. When prevention strategies are conceptualised at the community level, protective factors include social determinants of health common to suicidal and addictive behaviours, such as mutual care, early childhood development, job security, housing, access to education, leisure spaces and social justice and inclusion policies. We should remember that "an ounce of prevention is worth a pound of cure," to quote Benjamin Franklin.

Psychological treatments: good psychotherapy saves lives

Reviewing the literature, we can affirm that psychological interventions are efficacious and effective in reducing both substance use disorders and other addictive behaviours, such as suicide ideation and attempts (Bahji et al., 2024; NICE, 2022). Psychological treatments for suicidal

behaviour are transdiagnostic and specific, i.e., they are indicated for people manifesting suicidal behaviours regardless of whether they have been diagnosed with SUD, something else or nothing at all, since such behaviours can occur in the presence or absence of another diagnostic label; the core of the problem is the experience of aspects such as a feeling of being trapped, the sense (or lack thereof) of belonging, the feeling of burden or the reasons for living, among others. These variables are considered in psychological models of suicidal behaviour, also known as ideation-to-action theories of suicide (Klonsky et al., 2018).

For the adult population, the intervention most studied by researchers is cognitive behavioural therapy for suicide prevention (Witt et al., 2021). The literature is also consistent in showing that dialectical behaviour therapy can reduce suicidal ideation, suicide attempts and self-harm in people diagnosed with borderline personality disorder (Al-Halabí et al., 2024), usually in parallel with substance use problems or concomitant diagnoses of SUD (Leichsenring et al., 2024). The brief intervention with the greatest empirical support for responding to suicidal crises is the safety plan by Stanley and Brown (2012), which should be included in every therapeutic process (NICE, 2022). It would also be of great interest to frame effective psychological treatments within a general context of intervention that has scientific support. Thus, the AIM-SP model (Assess, Intervene, Monitor for Suicide Prevention) is a comprehensive intervention procedure with empirical support that can be applied to everyday clinical practice (Brodsky et al., 2018).

Suicidal behaviour and substance use

Being diagnosed with SUD is consistently associated with the different manifestations of suicidal behaviour (WHO, 2014; Rizk et al., 2021). Thus, the systematic review by Espinet et al. (2019) found that addiction to alcohol and other drugs has been established as an important risk factor. Studies with clinical cohorts indicate that the lifetime possibility of dying by suicide is 5 to 10 times higher in people diagnosed with SUD than in the general population. The chance of death by suicide among those diagnosed with alcohol use disorders is 10 times greater than what would be expected in the general population; it is 14 times greater for opioid use disorder and 17 times greater for polydrug use. Furthermore, the prevalence of lifetime suicide attempts among individuals diagnosed with SUD ranges from 24% to 78%.

Likewise, the meta-analysis by Poorolajat et al. (2016), which included 43 studies with 870,967 participants, found a significant association between SUD diagnosis and suicidal ideation (OR = 2.04, 16 studies), suicide attempt (OR = 2.49, 24 studies) and death by suicide (OR = 1.49, 7 studies). The review by Leza et al. (2024) put the prevalence of suicidal ideation in people undergoing treatment for SUD at between 20% and 62.2%, while the prevalence of suicide attempts ranged from 15.8% to 52.1%. Within the context of the psychological approach to SUD, suicidal behaviour thus represents an important clinical concern that warrants careful investigation of the factors involved (Espinet et al., 2019). Furthermore, epidemiological models have described substance use, in its different forms, as a risk factor for suicidal behaviours not only in adults but also in child and adolescent populations (Al-Halabí & Fonseca-Pedrero, 2023).

On the other hand, Jenkins et al. (2023) have recently focused on the experiences of dehumanisation suffered by people with mental health difficulties or problems, proposing a new association of this phenomenon with death by suicide. They highlight people diagnosed with psychosis and SUD as examples which are particularly vulnerable to dehumanisation. Thus, the authors include as sources of meta-dehumanisation (the perception that oneself is "less" human than other people) the interactions with society, professionals, institutions and the media, which would impact self-dehumanisation and stigmatisation of these people with difficulties (Crapanzano et al., 2018). The authors point out that it is therefore necessary to go beyond mere health benefits and to consider specific protocols for the rehumanisation of services and care by professionals and society as a whole (Jenkins et al., 2023). This is particularly relevant in the case of addictive behaviours because, although there are differences between autonomous communities (Fernández-Miranda et al., 2024), the various addiction and mental health services have historically been separated, and different conceptualisations regarding treatments and recovery, or carrying out parallel interventions, have been grouped together in a way that may be far from the care chains based on good clinical practice (NICE, 2022).

The road ahead

Suicide is a social public health problem, and there is a considerable body of knowledge on the association between the various manifestations of suicidal behaviour and SUD (Shirayly et al., 2024), albeit with considerable room for improvement. For example, over a decade has passed since Conner et al. (2007) pointed out that the question whether suicidal behaviour and involuntary overdose were related behaviours with a similar profile or represented different behaviours with different risk factors has not yet been resolved. Resolving this issue would have important implications for prevention. For example, sharing a common profile could suggest the value of common prevention measures, while, if they were qualitatively different behaviours or with different correlates, prevention strategies should be more specific. As it stands, clear results regarding this issue are yet to be determined (Mitchell et al., 2021). This

is so, perhaps, because it is not so much about providing an answer, but about asking the right questions that likely involve a functional understanding of both behaviours, seeing them in the service of what, or what function, they fulfil in each person as a form of affective regulation (Coppersmith et al., 2023).

Most of the evidence obtained so far is not based on long-term prospective cohort studies, so more research is required. New studies are also needed to assess and compare the association between suicide and different types of substances, the dose-response relationship and the way and the contexts in which they are consumed (Strickland & Acuff, 2023). Beyond the recommendations indicated above, assessments of suicidal behaviour in people diagnosed with SUD are, at the moment, scarce and heterogeneous. Some authors recommend systematic screening for suicidal behaviour in people who request treatment for addictive behaviour problems (Leza et al., 2024).

In both suicidal behaviour and addictions, there is a call to leave the biomedical model of health behind, in its brain-centric, paternalistic and symptom-based form, and to give way to a radically psychological perspective, focused on the person, their being-in-the-world and their capabilities. This would be based on the processes of change, and would offer a collaborative approach with the possibility of talking in detail about their experiences and giving meaning to their biography, developing a shared and comprehensive vision of the psychological problems or the reasons why the person has decided to seek help to address them with empirically supported psychological treatments which have been described in the literature (Fonseca Pedrero, 2021a, 2021b).

Suicidal behaviour and addictive behaviours can be prevented, but solid and multisectoral strategies for prevention are lacking. Spain needs a National Plan for the Prevention of Suicidal Behaviour that includes, in line with those indicated by the WHO (2014), policies to reduce harmful alcohol use or to monitor and offer community support for people with substance use problems. And, as a social phenomenon with structural significance, all of this requires a holistic, collective, community and governmental response that does not stop at individualistic, simplistic or short-term measures and that, of course, must go beyond the health system.

The level of understanding regarding human behaviour, as well as access to preventive interventions and psychological treatments have improved, alongside a reduction in the associated stigma and taboo. Nevertheless, from another perspective, the response to this reality looks very different since advances in leadership, governance and financing in terms of social services and mental health are as yet conspicuous by their absence.

As evidence-based prevention interventions evolve and become consolidated, it is essential to ensure that effective interventions are efficiently implemented in practice and translated into quality programs and care that benefits people with psychological suffering.

It is necessary to implement accessible, inclusive, public, timely, multisectoral actions on the basis of empirical evidence. The goal is to generate hope and social and health resources. The objective is to build a collective scaffolding within which vulnerable people, such as those with addictive and suicidal behaviours, can seek help when they need it.

Acknowledgements

This research has been funded by the Spanish Ministry of Science and Innovation (MCIN) and the Spanish State Agency for Research (AEI), and the European Regional Development Fund (Project PID2021-127301OB-I00, financed by MCIN /AEI /10.13039/501100011033 / ERDF, EU).

References

Al-Halabí, S. & Fonseca-Pedrero, E. (2021). Suicidal behaviour prevention: The time to act is now. *Clínica y Salud, 32*(2), 89-92. https://doi.org/10.5093/clysa2021a17

Al-Halabí, S. & Fonseca-Pedrero, E. (Eds.) (2023). *Manual de Psicología de la Conducta Suicida*. Pirámide.

Al-Halabí, S., García-Haro, J. & González-González, M. (2023). La entrevista clínica como relación de ayuda en la conducta suicida. In S. Al-Halabí & E. Fonseca-Pedrero (Eds.), *Manual de psicología de la conducta suicida* (pp. 317-352). Pirámide.

Al-Halabí, S., Rodríguez Otero, J. E. & Fonseca Pedrero, E. (2024). Tratamiento de la conducta suicida en el trastorno límite de la personalidad. In J. A. Díaz Garrido, S. Al-Halabí, J. A. Cangas & F. Rodríguez Otero (Eds.), *Tratamientos psicológicos en los trastornos de la personalidad. I. Fundamentos, características y persona* (pp. 149-184). Pirámide

Al-Halabí, S., Sáiz, P. A., Burón, P., Garrido, M., Benabarre, A., Jiménez, E., Cervilla, J., Navarrete, M. I., Díaz-Mesa, E. M., García-Álvarez, L., Muñiz, J., Posner, K., Oquendo, M. A., García-Portilla, M. P. & Bobes, J. (2016). Validation of a Spanish version of the Columbia-Suicide Severity Rating Scale (C-SSRS). *Revista de psiquiatria y salud mental*, *9*(3), 134–142. https://doi.org/10.1016/j.rpsm.2016.02.002

Ayer, L., Stevens, C., Reider, E., Sims, B., Colpe, L. & Pearson, J. (2023). Preventing Youth Suicide: Potential "Crossover Effects" of Existing School-Based Programs. *Prevention Science*, *24*(2), 382-392. https://doi.org/10.1007/S11121-022-01473-2

Bahji, A., Crockford, D., Brasch, J., Schutz, C., Buckley, L., Danilewitz, M., Dubreucq, S., Mak, M. & George, T. P. (2024). Training in Substance use Disorders, Part 1: Overview of Clinical Practice Recommendations. *Canadian journal of psychiatry*, *69*(6), 428-456. https://doi.org/10.1177/07067437241231128

Brodsky, B. S., Spruch-Feiner, A. & Stanley, B. (2018). The Zero Suicide Model: Applying Evidence-Based Suicide Prevention Practices to Clinical Care. *Frontiers in Psychiatry, 9*, 33. https://doi.org/10.3389/fpsyt.2018.00033

Calvo, F., Alfranca, R., Carbonell, X., Molina, E. & Font-Mayolas, S. (2023). The health of individuals experiencing homelessness: A 15-year retrospective cohort study. *Journal of Social Distress and Homelessness, 32*(2), 189-199).

Calvo, F., Carbonell, X., Johnsen, S., Panadero, S., Vázquez, J. J., Calvet, A., McInnes, K. & Font-Mayolas, S. (2024). Mortality and suicide among persons experiencing homelessness: A seven-year follow-up study. Advance online publication. *Psicothema*.

Chiles, J. A., Strosahl, K. D. & Roberts, L. W. (2019). *Clinical manual for assessment and treatment of suicidal patients* (2ª ed.). American Psychiatric Association.

Conner, K. R., Britton, P. C., Sworts, L. M. & Joiner, T. E., Jr (2007). Suicide attempts among individuals with opiate dependence: The critical role of belonging. *Addictive behaviors*, *32*(7), 1395-1404. https://doi.org/10.1016/j.addbeh.2006.09.012

Coppersmith, D. D. L., Millgram, Y., Kleiman, E. M., Fortgang, R. G., Millner, A. J., Frumkin, M. R., Bentley, K. H. & Nock, M. K. (2023). Suicidal thinking as affect regulation. *Journal of psychopathology and clinical science*, *132*(4), 385-395. https://doi.org/10.1037/abn0000828

Crapanzano, K. A., Hammarlund, R., Ahmad, B., Hunsinger, N. & Kullar, R. (2018). The association between perceived stigma and substance use disorder treatment outcomes: A review. *Substance abuse and rehabilitation*, *10*, 1-12. https://doi.org/10.2147/SAR.S183252

Dowling, N. A., Rodda, S. N. & Merkouris, S. S. (2023). Applying the Just-In-Time Adaptive Intervention Framework to the Development of Gambling Interventions. *Journal of gambling studies*. https://doi.org/10.1007/s10899-023-10250-x

Eslava, D., Martínez-Vispo, C., Villanueva-Blasco, V. J., Errasti, J. M. & Al-Halabí, S. (2023). Family Conflict and Suicidal Behaviour in Adolescence: The Mediating Role of the Assertive Interpersonal Schema. *Sustainability, 15*(6), 5149. https://doi.org/10.3390/su15065149

Espinet, S., Corrin, T., Baliunas, D., Quilty, L., Zawertailo, L., Rizvi, S. J., deRuiter, W., Bonato, S., De Luca, V., Kennedy, S. & Selby, P. (2019). Predisposing and protective factors influencing suicide ideation, attempt, and death in patients accessing substance use treatment: A systematic review and meta-analysis protocol. *Systematic reviews*, *8*(1), 115. https://doi.org/10.1186/s13643-019-1028-2

Fartacek, C., Kunrath, S., Aichhorn, W. & Plöderl, M. (2023). Therapeutic alliance and change in suicide ideation among psychiatric inpatients at risk for suicide. *Journal of affective disorders*, *323*, 793-798. https://doi.org/10.1016/j.jad.2022.12.028

Fernández-Miranda, J. J., Fontoba-Díaz, J., Díaz-Fernández, S. & Pascual-Pastor, F. (2024). Co-occurrence of substance use disorders and other mental disorders in people undergoing specific treatment for any of them in Spain. *Adicciones*, *36*(1), 31–40. https://doi.org/10.20882/adicciones.1692

Fonseca-Pedrero, E. (Ed.) (2021a). *Manual de tratamientos psicológicos. Infancia y Adolescencia*. Pirámide.

Fonseca-Pedrero, E. (Ed.) (2021b). *Manual de tratamientos psicológicos. Adultos*. Pirámide.

Fonseca-Pedrero, E., Díez-Gómez, A., Pérez-Albéniz, A., Lucas-Molina, B., Al-Halabí, S. & Calvo, P. (2023). Profesionales de la Psicología en Contextos Educativos: Una Necesidad Ineludible. *Papeles del Psicólogo, 44*(3),112-124. https://doi.org/10.23923/pap.psicol.3018

Fonseca Pedrero, E., Pérez-Albéniz, A. & Al-Halabí, S. (2022). Conducta suicida en adolescentes a revisión: Creando esperanza a través de la acción. *Papeles del Psicólogo, 43*(3), 173-184. https://doi.org/10.23923/pap.psicol.3000

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

García-Haro, J. M., García-Pascual, H., González-González, M., Barrio-Martínez, S. & García-Pascual, R. (2020). Suicidio y trastorno mental: Una crítica necesaria. *Papeles del Psicólogo, 41*, 35-42. https://dx.doi.org/10.23923/pap.psicol2020.2919

García-Haro, J., González-González, M., Fonseca-Pedrero, E. & Al-Halabí, S. (2023). Conceptualización de la conducta suicida. In S. Al-Halabí & E. Fonseca-Pedrero (Eds.), *Manual de psicología de la conducta suicida* (pp. 31-68). Pirámide.

Hawton, K., Lascelles, K., Pitman, A., Gilbert, S. & Silverman, M. (2022). Assessment of suicide risk in mental health practice: Shifting from prediction to therapeutic assessment, formulation, and risk management. *The lancet. Psychiatry, 9*(11), 922-928. https://doi.org/10.1016/S2215-0366(22)00232-2

Huggett, C., Gooding, P., Haddock, G., Quigley, J. & Pratt, D. (2022). The relationship between the therapeutic alliance in psychotherapy and suicidal experiences: A systematic review. *Clinical psychology & psychotherapy*, *29*(4), 1203-1235. https://doi.org/10.1002/cpp.2726

Instituto Nacional de Estadística, INE (2023). Defunciones según la causa de muerte. INE. https://www.ine.es/prensa/edcm_2022_d.pdf

Jenkins, T.A., Robison, M. & Joiner, T. E. (2023). Dehumanization and mental health: Clinical implications and future directions. *Current Opinion in Behavioral Sciences, 50*, 101257. https://doi.org/10.1016/j.cobeha.2023.101257.

Jobes, D. A., Mandel, A. A., Kleiman, E. M., Bryan, C. J., Johnson, S. L. & Joiner, T. E. (2024). Facets of Suicidal Ideation. *Archives of suicide research*, 1-16. https://doi.org/10.1080/13811118.2023.2299259

Kleiman, E. M., Turner, B. J., Fedor, S., Beale, E. E., Huffman, J. C. & Nock, M. K. (2017). Examination of real-time fluctuations in suicidal ideation and its risk factors: Results from two ecological momentary assessment studies. *Journal of abnormal psychology*, *126*(6), 726-738. https://doi.org/10.1037/abn0000273

Klonsky, E. D., Saffer, B. Y. & Bryan, C. J. (2018). Ideation-to-action theories of suicide: A conceptual and empirical update. *Current opinion in psychology*, *22*, 38-43. https://doi.org/10.1016/j.copsyc.2017.07.020

Kreitchmann, R. S., Nájera, P., Sanz, S. & Sorrel, M. A. (2024). Enhancing content validity assessment with Item Response Theory modeling. *Psicothema, 36*(2), 145-153. https://doi.org/10.7334/psicothema2023.208

Large, M., Galletly, C., Myles, N., Ryan, C. J. & Myles, H. (2017). Known unknowns and unknown unknowns in suicide risk assessment: Evidence from meta-analyses of aleatory and epistemic uncertainty. *BJPsych bulletin, 41*(3), 160-163. https://doi.org/10.1192/pb.bp.116.054940

Leichsenring, F., Fonagy, P., Heim, N., Kernberg, O. F., Leweke, F., Luyten, P., Salzer, S., Spitzer, C. & Steinert, C. (2024). Borderline personality disorder: A comprehensive review of diagnosis and clinical presentation, etiology, treatment, and current controversies. *World psychiatry*, *23*(1), 4-25. https://doi.org/10.1002/wps.21156

Leza, L., Haro, B., López-Goñi, J. J. & Fernández-Montalvo, J. (2024). Substance use disorder and lifetime suicidal behaviour: A scoping review. *Psychiatry research*, *334*, 115830. https://doi.org/10.1016/j.psychres.2024.115830

Mann, J. J., Michel, C. A. & Auerbach, R. P. (2021). Improving Suicide Prevention Through Evidence-Based Strategies: A Systematic Review. *The American Journal of Psychiatry*, *178*(7), 611-624. https://doi.org/10.1176/APPI.AJP.2020.20060864

Ministerio de Sanidad, Servicios Sociales e Igualdad (2017). *Estrategia Nacional sobre Adicciones 2017-2024*. Secretaría General Técnica. Centro de Publicaciones. Delegación del Gobierno para el Plan Nacional sobre Drogas.

Mitchell, S. M., Brown, S. L., Görgülü, T., Conner, K. R. & Swogger, M. T. (2021). Substance use, current criminal justice involvement, and lifetime suicidal thoughts and behaviors history: The moderating role of thwarted belonging. *Suicide & life-threatening behavior*, *51*(2), 237-246. https://doi.org/10.1111/sltb.12699

McDaid, D., Kennelly, B., Ahren, S. & McElroy, B. (2021). An economic perspective on suicide across the five continents. In D. Wasserman (Ed.), *Oxford Textbook of Suicidology and Suicide Prevention* (pp. 409-419). Oxford University Press.

Mughal, F., Burton, F. M., Fletcher, H., Lascelles, K., O'Connor, R. C., Rae, S., Thomson, A. B. & Kapur, N. (2023). New guidance for self-harm: An opportunity not to be missed. *The British journal of psychiatry*, *223*(5), 501-503. https://doi.org/10.1192/bjp.2023.113

National Institute for Health and Care Excellence, NICE (2022). *Self-harm: assessment, management and preventing recurrence*. https://www.nice.org.uk/guidance/ng225

Organización Mundial de la Salud (2014). *Prevención del suicidio: un imperativo global*. Organización Panamericana de la Salud.

Organización Panamericana de la Salud (2021). V*ivir la vida: Guía de aplicación para la prevención del suicidio en los países.* World Health Organization. https://iris.paho.org/bitstream/handle/10665.2/54718/9789275324240_spa.pdf?sequence=1&isAllowed=y

Pérez-Álvarez, M. (2018). Para pensar la psicología más allá de la mente y el cerebro: Un enfoque transteórico. *Papeles del Psicólogo, 39*(3), 161-173

Pirkis, J., Gunnell, D., Hawton, K., Hetrick, S., Niederkrotenthaler, T., Sinyor, M., Yip, P. S. F. & Robinson, J. (2023). A Public Health, Whole-of-Government Approach to National Suicide Prevention Strategies. *Crisis*, *44*(2), 85-92. https://doi.org/10.1027/0227-5910/a000902

Platt, S., Arensman, E. & Rezaeian, M. (2019). National suicide prevention strategies - Progess and Challenges. Crisis, 40(2), 75-82. https://doi.org/10.1027/0227-5910/a000587

Poorolajal, J., Haghtalab, T., Farhadi, M. & Darvishi, N. (2016). Substance use disorder and risk of suicidal ideation, suicide attempt and suicide death: A meta-analysis. *Journal of public health*, *38*(3), e282-e291. https://doi.org/10.1093/pubmed/fdv148

Rizk, M. M., Herzog, S., Dugad, S. & Stanley, B. (2021). Suicide Risk and Addiction: The Impact of Alcohol and Opioid Use Disorders. *Current addiction reports*, *8*(2), 194-207. https://doi.org/10.1007/s40429-021-00361-z

Roos, C. R. & Witkiewitz, K. (2017). A contextual model of self-regulation change mechanisms among individuals with addictive disorders. *Clinical psychology review*, *57*, 117-128. https://doi.org/10.1016/j.cpr.2017.08.008

Turecki, G., Brent, D. A., Gunnell, D., O'Connor, R. C., Oquendo, M. A., Pirkis, J. & Stanley, B. H. (2019). Suicide and suicide risk. *Nature Reviews. Disease Primers, 5*(1), 74. https://doi.org/10.1038/s41572-019-0121-0

Stanley, B. & Brown, G. K. (2012). Safety Planning Intervention: A Brief Intervention to Mitigate Suicide Risk. *Cognitive and Behavioral Practice, 19*(2), 256-264. https://doi.org/10.1016/j.cbpra.2011.01.001

Strickland, J. C. & Acuff, S. F. (2023). Role of social context in addiction etiology and recovery. *Pharmacology, biochemistry, and behavior*, *229*, 173603. https://doi.org/10.1016/j.pbb.2023.173603

Walsh, E. H., McMahon, J. & Herring, M. P. (2022). Research Review: The effect of school-based suicide prevention on suicidal ideation and suicide attempts and the role of intervention and contextual factors among adolescents: A meta-analysis and meta-regression. *Journal of child psychology and psychiatry, and allied disciplines, 63*(8), 836-845. https://doi.org/10.1111/jcpp.13598

Wasserman, D. (Ed.) (2021). *Oxford Textbook of Suicidology and Suicide Prevention.* Oxford University Press.

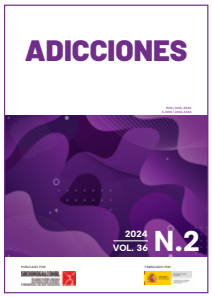
Witt, K. G., Hetrick, S. E., Rajaram, G., Hazell, P., Taylor Salisbury, T. L., Townsend, E. & Hawton, K. (2021). Psychosocial interventions for self-harm in adults. *The Cochrane Database of Systematic Reviews*, *4*(4), CD013668. https://doi.org/10.1002/14651858.CD013668.pub2

Yuodelis-Flores, C. & Ries, R. K. (2015). Addiction and suicide: A review. *The American journal on addictions, 24*(2), 98-104. https://doi.org/10.1111/ajad.12185

Zalsman, G., Hawton, K., Wasserman, D., van Heeringen, K., Arensman, E., Sarchiapone, M., Carli, V., Höschl, C., Barzilay, R., Balazs, J., Purebl, G., Kahn, J. P., Sáiz, P. A., Lipsicas, C. B., Bobes, J., Cozman, D., Hegerl, U. & Zohar, J. (2016). Suicide prevention strategies revisited: 10-year systematic review. *The Lancet Psychiatry*, *3*(7), 646-659. https://doi.org/10.1016/S2215-0366(16)30030-X

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

ADICCIONES
2024 ■ VOL. 36 ■ N. 2 ■ PAGES 129–144
www.adicciones.es



ORIGINAL

Certification program of Addiction Centres for hepatitis C virus elimination in Spain. HepCelentes Project

Programa de certificación de Centros de Adicciones para la eliminación del virus de la hepatitis C en España. Proyecto HepCelentes

Joan Colom*, Marta Torrens**,***, Ángeles Rodríguez-Cejas****, Ignacio Aguilar*****, Rocío Álvarez-Crespo******, Lorenzo Armenteros*******, Victoria Ayala********, Helena Cantero********, Miguel Ángel Casado*********, Javier Crespo**********, Joaquín Estévez**********, Javier García-Samaniego**********,**********, Manuel Hernández-Guerra**********, Carlos Mur**********, Eva Pérez-Bech**********, Mercedes Ricote**********, Juan Antonio Pineda**********.

* Programa de Prevención, Control y Atención al VIH, las ITS y las Hepatitis Víricas (PCAVIHV) y Subdirección General de Drogodependencias. Agencia de Salud Pública de Cataluña, Departamento de Salud, Generalitat de Catalunya, Barcelona, España. ** Directora de Adicciones, Instituto de Neuropsiquiatría y Adicciones- Hospital del Mar, Barcelona, España. *** Prof. Psiquiatría, Universitat Autònoma de Barcelona, y Universitat de Vic-UCC, Barcelona, España. **** Centro Provincial de Drogodependencias, Sevilla, España. ***** Centro de Salud El Ejido, Almería, España. ****** Centro de Inserción Social José Hierro, Santander, España. ******* Centro de Salud Islas Canarias, Lugo, España. ******** Gilead Sciences, Madrid, España. ********* Pharmacoeconomics & Outcomes Research Iberia (PORIB), Madrid, España. ********** Hospital Universitario Marqués de Valdecilla. IDIVAL Santander, Cantabria, España. ********** Ministerio de Sanidad, Madrid, España. ********** Hospital Universitario La Paz, Madrid, España. ********** CIBERehd. IdiPAZ, Madrid, España.********** Servicio de Aparato Digestivo. Hospital Universitario de Canarias, Tenerife, España.********** Clínicas CAT, Barcelona, España. ********** Federación Nacional de Enfermos y Trasplantados Hepáticos (FNETH), Madrid, España. ********** Centro de Salud Mar Báltico, Madrid, España.********** Hospital Universitario de Valme, Sevilla, España.

Abstract

Microelimination strategies for the hepatitis C virus (HCV) in vulnerable populations, such as users of Addiction Centres (AC), are key for the elimination of hepatitis C. The aim of the HepCelentes project was to design a certification program for AC from the generation of a guide with the criteria to favour the prevention, diagnosis, control, and treatment of HCV in Spain. The project was structured in 4 phases: normalisation, implementation, certification, and communication. In the first phase, developed between July and December 2020, a Steering Committee was created (formed by representatives of scientific societies, healthcare professionals from AC, primary care centres and hospital units, and patient associations) that, from of an exhaustive bibliographic review, generated by consensus an accreditation guide for AC. The guide consists of 22 criteria (15 mandatory and 7 recommended) structured based on the requirements to be met by AC, justification for the selection, level of action (management, prevention, diagnosis and treatment/follow-up), measurement of the indicator, objective level to be achieved, evidence of compliance, clarifications to improve understanding, and mandatory / recommendation (depending on their relevance to achieve HCV elimination and its feasibility for implementation in real practice). The development of a certification system for the AC, based on consensus and coordination of multidisciplinary teams, is intended to favour the management of hepatitis C and its elimination in AC users, supporting the international, national, and regional elimination strategies.

Keywords: Addiction Centres, vulnerable population, hepatitis C virus, elimination, certification, quality

Resumen

Las estrategias de microeliminación del virus de la hepatitis C (VHC) en poblaciones vulnerables, como los usuarios de los centros de adicciones (CA), son fundamentales para lograr la eliminación de la hepatitis C. El objetivo del proyecto HepCelentes fue diseñar un programa de certificación para los CA, a partir de la generación de una guía con los criterios para favorecer la prevención, diagnóstico, control y tratamiento del VHC en España. El proyecto se estructuró en 4 fases: normalización, implementación, certificación y comunicación. En la primera fase, desarrollada entre julio y diciembre de 2020, se creó un Comité de Normalización (formado por representantes de sociedades científicas, profesionales sanitarios de CA, centros de atención primaria, unidades hospitalarias, y asociaciones de pacientes) que, a partir de una revisión bibliográfica exhaustiva, generó por consenso una guía de certificación de los CA. La guía consta de 22 criterios (15 obligatorios y 7 recomendados) estructurados en base a la definición del criterio, justificación de su selección, nivel de actuación (gestión, prevención, diagnóstico y tratamiento/seguimiento), fórmula de medición, nivel objetivo a alcanzar, evidencias de su cumplimiento, aclaraciones para mejorar su comprensión y obligatoriedad/recomendación (en función de la relevancia en la eliminación y capacidad de implementación). El desarrollo de un sistema de certificación para los CA, a partir del consenso y la coordinación de equipos multidisciplinares, pretende favorecer el manejo de la hepatitis C y su eliminación en los usuarios de los CA, apoyando las estrategias de eliminación internacionales, nacionales y autonómicas.

Palabras clave: Centros de Adicciones, población vulnerable, virus de la hepatitis C, eliminación, certificación, calidad

■ *Received: September 2021; Accepted: February 2022.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Miguel Ángel Casado. Pharmacoeconomics & Outcomes Research Iberia (PORIB). Paseo Joaquín Rodrigo 4-I, 28224, Madrid.
Email: ma_casado@porib.com

Hepatitis C represents a high burden of disease associated with the development of liver complications and mortality and its economic impact (Turnes, Domínguez-Hernández & Casado, 2017), especially in people receiving treatment for addictive disorders due to substance use (Lozano, Domeque, Perálvarez, Torrellas & Gonzalo, 2019). In 2016, the World Health Organization (WHO) set 2030 as a target for the universal elimination of the hepatitis C virus (HCV), with elimination considered to be an 80% reduction in the incidence of new infections and a 65% reduction in HCV mortality (World Health Organization, 2016). One year earlier, Spain implemented the strategic plan for tackling hepatitis C (PEAHC) through its national health system (Ministry of Health, 2015, 2020a); this was aligned with other plans for the prevention, control and elimination of hepatitis C developed by the Autonomous Communities, highlighting the involvement of doctors and health professionals in achieving the elimination of hepatitis C. As a result of these actions, Spain could be one of the first countries to meet this target (Polaris Observatory Collaborators, 2021).

To achieve the elimination of hepatitis C, micro-elimination strategies have been implemented in recent years; these are focused on specific subgroups, such as those with the highest prevalence and at-risk or vulnerable populations. These measures have been aimed primarily at screening for HCV infection, simplifying diagnosis, linking diagnosis and early treatment, periodic assessment of people at risk of reinfection, improving health policy measures and defining indicators (Alianza para la Eliminación de las Hepatitis Víricas en España, AEHVE, 2021; Crespo et al., 2019a; Grupo técnico de cribado de la infección por el VHC, 2021; Ministerio de Sanidad, 2020b).

Despite a decrease in recent years largely due to the use of direct-acting antivirals (DAAs) of high effectiveness, easy administration, less need for follow-up and efficiency compared to previous therapies (American Association for the Study of Liver Diseases, 2021; Calleja et al., 2018; Crespo et al., 2020; Ghany, Morgan & AASLD-IDSA Hepatitis C Guidance Panel, 2020; Mennini et al., 2021; Pawlotsky et al., 2020; Turnes et al., 2017), the prevalence of hepatitis C remains high in vulnerable populations (1.02%) (Rodríguez-Tajes et al., 2020). While a great effort has been made in Spain, and a large number of people have been diagnosed and treated, there are still barriers to approaching the most vulnerable groups, such as drug users, who have greater exposure to contracting infectious diseases and, for the most part, reject health care, thus making it difficult to detect and monitor the disease (Parés-Badell et al., 2017; Roncero, Vega, Martínez-Raga & Torrens, 2017). It is estimated that the prevalence of active HCV infection in this population is between 50% and 56% (Grebely et al., 2019), with undiagnosed infection at around 35.8% (Saludes et al., 2019). Furthermore, risky behaviours among drug users, even after effective treatment, result in high rates of reinfection (4.76%) and are an important route of HCV transmission (Midgard et al., 2016; Pineda et al., 2015). On the other hand, compared to the general population, this group presents suboptimal diagnosis, less linkage to care and, in some cases, use of hepatotoxic substances, essentially alcohol, which implies a greater risk of fibrosis progression (Folch et al., 2021; Morales-Arráez et al., 2020).

Addiction centres offer socio-health care and comprehensive treatment, with teams of multidisciplinary professionals, to people with addiction problems. Drug users regularly go this centres, becoming a key point of action for the management of users with hepatitis C. The centres are integrated differently in each Autonomous Community, through the primary care network, mental health network, social resources, etc. (Ministry of Health, 2021), so there is variability in the care process for hepatitis C, which leads to heterogeneous management of users. Therefore, it is important that addiction centres are involved in effective and efficient ways, promoting strategies or actions for the development and improvement of care circuits to facilitate the diagnosis, treatment and follow-up of users with hepatitis C, as well as the establishment of coordination and interaction mechanisms between the different levels of care (addiction centres, primary care centres and hospital units). The development of a certification system for these centres to normalize and systematize their work in a multidisciplinary framework that accredits their commitment to the elimination of hepatitis C and that recognizes and gives visibility to the work of the addiction centre professionals would help to promote these strategies. Thus, the objective of this paper was thus to describe the HepCelentes project, aimed at designing a certification program for addiction centres for the elimination of HCV in Spain and to show the criteria for the guide developed in the first phase of the project.

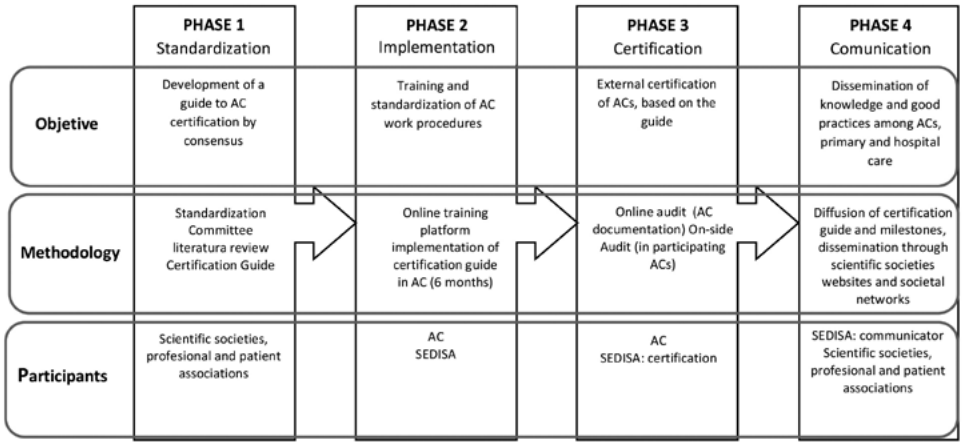
Method

Description and phases of the HepCelentes Project

The aim of the HepCelentes project is to establish a certification program for addiction centres, based on consensus and the creation of a guide comprising objective, specific and measurable criteria, to standardize the procedures of these centres, and promote prevention, control and monitoring of users with hepatitis C. Along these lines, it aims: a) to establish a series of criteria, agreed by a group of experts in the management of HCV infection, representatives of scientific societies and health management to improve care for users with hepatitis C in addiction centres; b) to standardize the working

Figure 1

Diagram of the phases of the HepCelentes project: objective, methodology and participation of the actors in the process



Note. AC: Addiction centres. Soc.: society. SEDISA: Sociedad Española de Directivos de la Salud.

procedures in addiction centres, promoting the creation and improvement of circuits that facilitate the diagnosis of infection, treatment and monitoring of patients and the creation of coordination mechanisms between addiction centres, primary care centres and hospital units; c) to develop a system of certification for addiction centres committed to the elimination of hepatitis C; d) to share knowledge and best practices among addiction centres; and e) to support the strategy of the Ministry of Health and the regional plans to prevent, control and eliminate hepatitis C, establishing working guidelines focused on the benefit of patients that strengthen integration between levels of care and can be maintained for good disease control.

The HepCelentes project was developed in four differentiated and sequential phases following qualitative research methods: standardization, implementation, certification and communication (Figure 1).

First phase: normalization

In the first phase, carried out between July and December 2020, a Steering Committee was created, led by the Sociedad Española de Directivos de la Salud (SEDISA), made up of representatives selected by their respective scientific societies with extensive experience in their practical fields, and health professionals from addiction centres, primary care centres and hospital units, as well as patient associations. This was followed by an exhaustive and structured review of the available scientific literature, with a search strategy based on the PICO methodology to locate relevant information on the handling, management and treatment of users of addiction centres in databases such as PubMed, Medes, Google Scholar, Web of Scientific Societies and review of grey literature in official bodies. This was completed with a free search.

Subsequently, based on the review of the located information, several deliberative meetings were held with the Steering Committee using nominal group methodology and complemented in the inter-meeting periods with discussions by email to define, agree on and prioritize the criteria to be included in the certification guide for addiction centres. These criteria were defined to standardize the work procedures of these centres and improve the provision of care to users with hepatitis C and were mainly based on the creation of circuits to facilitate infection diagnosis, treatment and follow-up of these patients and the creation of coordination mechanisms between addiction centres, primary care centres and hospital units. After the SEDISA technical team prepared several working drafts, a final deliberative meeting was held with the Steering Committee to validate and agree on the final version of the certification guide for addiction centres committed to HCV elimination.

Subsequent phases: implementation, certification and communication

The following phases of the project are currently underway.

The aim of the second phase, implementation, is to standardize addiction centre work procedures. To this end, a project presentation meeting will be held, coordinated by SEDISA, in which all centres interested in joining the program will participate. This will be followed by a 6-month period for implementing the indicators in the addiction centres. In addition, a web platform will be developed to provide online documentation of the certification guide, a training area on the approach to liver diseases and the elimination of hepatitis C, guidelines for the certification process and technical assistance.

In the third phase, with SEDISA acting as an external certifying entity, the certification process for the addiction centres will be established. This will include a documentary audit to assess compliance with the criteria in which the centres will have to show evidence of meeting the requirements on the web platform enabled for this purpose.

In addition, there will be a random face-to-face audit in 20% of the centres at their facilities. The centres that want to apply for certification must meet all the mandatory criteria and, in the event that any of these criteria cannot be met, this must be justified in due course.

The fourth phase, communication, will focus on the dissemination of knowledge and best practices among all the centres involved, in addition to delivering the certification guide and the project itself. Different levels of communication have been established, promoted mainly by scientific societies, associations of health professionals, and patient associations. The aim is to achieve wider dissemination through inclusion on the web pages of these organisations and on social networks.

Workgroup

The Steering Committee was based on the selection and incorporation of a multidisciplinary panel of experts in the management of hepatitis C and addiction centres, of recognized professional prestige, led by the Sociedad Española de Directivos de la Salud (SEDISA).

The following organisations have collaborated on the HepCelentes project: Asociación Española para el Estudio del Hígado (AEEH), Alianza para la Eliminación de las Hepatitis Víricas en España (AEHVE), Federación Nacional de Enfermos y Trasplantados Hepáticos (FNETH), Grupo de Estudio de Hepatitis Víricas (GEHEP) de la Sociedad Española de Enfermedades Infecciosas y Microbiología Clínica (SEIMC), Sociedad Científica Española de Estudios sobre el Alcohol, el Alcoholismo y las otras Toxicomanías (Socidrogalcohol), Sociedad Española de Directivos de la Salud (SEDISA), Sociedad Española de Médicos de Atención Primaria (SEMERGEN), Sociedad Española de Médicos Generales y de Familia (SEMG), Sociedad Española de Patología Digestiva (SEPD) and Sociedad Española de Patología Dual (SEPD).

Results

The certification guide with the requirements to be met by addiction centres committed to eliminating HCV, as prepared in the first phase of the HepCelentes project and agreed by the experts of the Steering Committee, comprises 22 criteria with a common structure based on the following elements: a) definition of the criterion; b) justification for criterion selection; c) level of action (management, prevention, diagnosis and treatment/monitoring); d) measurement formula; e) target level to be achieved; f) evidence of compliance; g) clarifications to enhance understanding; and e) mandatory/recommended status.

Depending on the level of action, six criteria were related to management, two to prevention, seven to diagnosis, and seven to treatment and patient follow-up. As a whole, a total of 15 criteria were considered mandatory and seven recommended, according to their relevance to elimination and their implementation capacity. Regarding the criteria based on diagnosis and treatment/monitoring, in which a formula was established as an indicator for measurement, the target level to be achieved was set at between 80% and

Table 1
Summary of criteria, by action level, mandatory and recommended status

Performance level (A-D) Criterion (1-22)	Mandatory (M) / Recommended (R)
A. Management	
1. Development of a hepatitis C elimination policy in addiction centre	M
2. Appointment of a project coordinator in addiction centre	M
3. Multidisciplinary committee with area professionals	R
4. Shared access to clinical history and patient registration	M
5. Training of professionals in hepatitis C	M
6. Adequate information systems	M
B. Prevention	
7. Health promotion plans and preventive programs	M
8. Risk reduction programs	M
C. Diagnosis	
9. Screening for HCV infection (in first consultation)	M
10. Screening for HBV and HIV coinfection	M
11. Annual HCV screening (users with risky habits)	M
12. Access to rapid serological diagnostic tests (anti-HCV)	R
13. One-step diagnosis (OSD)	R
14. Determination of virological markers (if no OSD available)	M
15. Annual detection of reinfections (users with risks habits)	M
D. Treatment and follow-up	
16. Patient journey with the hospital specialist	M
17. Consensus protocol with gastroenterology/ infectious disease services	M
18. Coordination/monitoring between addiction centre and hospital specialist	M
19. Adherence control (users with poor adherence)	R
20. Promoting the use of telemedicine	R
21. Documentary record of the process	R
22. Promoting hospital or peer accompaniment	R

Note. HCV: hepatitis C virus; HBV: hepatitis B virus; HIV: human immunodeficiency virus.

90%. Evidence of compliance was established with two types of audits, documentary and face-to-face (the latter in 20% of the participating centres, randomly selected).

The management criteria were based on the commitment, coordination and collaboration between centres, provision of information and training of professionals. Those related to prevention were based on plans and programs for health promotion and risk reduction. The diagnostic criteria focused mainly on screening and access to HCV testing and one-step diagnosis for addiction centre users. The treatment/monitoring criteria were defined taking into account the coordination between the physicians at the addiction centres and the gastroenterology, hepatology and infection services, the ease of application in the patient care circuit, the possibility of dispensing drugs at the addiction centre and telemedicine, among others.

Table 1 specifies all the certification guide criteria, classified by the level of action: management, prevention, diagnosis and treatment/monitoring, and with information on their mandatory status. The detailed characteristics of each of the guideline criteria are shown in Tables 2, 3, 4 and 5.

Table 2
Criteria related to management level

Criteria related to management level.	Hepatitis C Elimination Policy in addiction centre (1)	Project coordinator in addiction centre (2)	Multidisciplinary committee with area professionals (3)	Shared access to clinical history and patient registration (4)	Training of professionals in hepatitis C (5)	Information systems (6)
Criterion definition	The centre must develop and approve a policy that demonstrates the commitment of the centre management to the elimination of hepatitis C.	The centre must designate a project coordinator, the reference person for primary and hospital care.	Establishment of a multidisciplinary committee with area professionals is recommended.	Maintenance of clinical history, if possible electronic, with shared access for addiction centres, primary care centres and specialized consultations, as well as patient registry, are recommended.	Addiction centre professionals must receive training in hepatitis C.	Appropriate information systems must be established to avoid loss of continuity between diagnosis, treatment and follow-up and also allow rapid problem solving.
Justification	By approving this policy, the centre commits in writing to start the project and provide the necessary resources. This commitment must be signed by the centre coordinator or director.	The centre must appoint a project coordinator to improve coordination with primary and hospital care, establishing direct communication mechanisms and facilitating problem solving.	The creation of a multidisciplinary committee (pharmacist, microbiologist, hepatologist, infectious disease specialist, psychiatrist, psychologist, family doctor, social worker, etc.) favours coordination between area professionals and improves patient follow-up.	The aim is for the centres to have an electronic medical record and for part of this data to be shared with the addictions, primary care and specialized consultation centres. In addition, the centres must maintain an updated registry of patients with hepatitis C.	Addiction centre professionals should receive training on advances in hepatitis C knowledge for management of their patients based on the best available medical evidence.	The centre must establish adequate information systems to guarantee the continuity of patient care and facilitate rapid problem solving.
Formula	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.
Target level	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.

Compliance evidence	The centre will have a policy that evidences the commitment to the elimination of hepatitis C, made available to users and other interest groups.	Identification of the responsible person through a record of appointment.	Committee meeting minutes will be reviewed.	***Documentary audit:*** The centre will attach to the platform a brief description of the characteristics of the clinical history and the registry, uploading an image of these, in which personal data protection is guaranteed. In the event that access is shared, the type of access will be reported and an image evidencing it will be attached. ***In-person audit:*** In the centre, the clinical history, the patient registry and the shared access will be evidenced in situ.	Certificates of completion of courses, attendance at congresses, etc., are considered evidence.	Evidence that the centre has an established information system will be reviewed.
Clarifications	If the centre already has an approved policy, this will be considered valid to evidence commitment, making it unnecessary to prepare another document.	Not applicable.	Not applicable.	Not applicable.	Certificates of completion of courses, attendance at congresses, etc., are considered evidence. It is recommended that all professionals in the addiction centre receive training regardless of their professional category. Only the training of physicians is considered mandatory. The project website will include a training section, completion of which will serve to meet this criterion.	Not applicable.
Mandatory / Recommended	Mandatory.	Mandatory.	Recommended.	Clinical history in any format: Mandatory. Electronic medical record with/ without external communication: Recommended. Hepatitis C patient registry: Mandatory.	Mandatory.	Mandatory.

Table 3
Criteria related to the level of prevention

Criterion (criterion number in the certification guide)	Health promotion plans and preventive programs (7)	Risk reduction programs (8)
Criterion definition	The addiction centre must establish health promotion plans and preventive programs for its patients.	The centre will implement risk reduction programs that reduce the possibility of new infections and reinfections. In addition, it will have informative materials aimed at the target population on HCV transmission and risk and harm reduction strategies, as well as information on treatments. It will also inform cohabitants and relatives about the risks, advising them not to share sharp objects, razor blades or toothbrushes that may come into contact with the blood of the person infected with HCV.
Justification	It is necessary that the centre has established health promotion plans and preventive programs for its patients.	Information, education and communication actions towards the target population will reduce the percentage of infected people. This makes it essential to provide information and stress the risks to avoid contagion.
Formula	Not applicable.	Not applicable.
Target level	Not applicable.	Not applicable.
Compliance evidence	*Documentary audit:* The centre will post the plans and programs that it has established in its centre on the platform. *On-site audit:* The centre's preventive plans and programs and their follow-up will be reviewed.	*Documentary audit:* The risk reduction programs and the informative material available to the centre will be reviewed. *Face-to-face audit:* Risk reduction programs, informative material and records of informative meetings will be reviewed in situ.
Clarifications	Not applicable.	It recommended to include advice in the informative materials on NGOs or patient associations that can provide support to the patient. In addition to information, educational and communicative actions, it is recommended that the centres provide users with sterile needles and hygiene kits (and condoms).
Mandatory / Recommended	Mandatory.	Mandatory.

Note. HCV: Hepatitis C virus. NGO: Non-governmental organization.

Table 4
Criteria related to diagnostic level

Criterion (criterion number in the certification guide)	Screening for HCV infection (first consultation) (9)	Screening for HBV and HIV coinfection (10)	Annual HCV screening (users with high-risk habits) (11)	Access to rapid serological diagnostic tests (anti-HCV) (12)	One-Step Diagnosis (OSD) (13)	Determination of virological markers (if no OSD available) (14)	Annual detection of reinfections (at-risk users) (15)
Criterion definition	All drug users must be screened for HCV infection at first consultation.	All drug users must be screened for HBV and HIV infection. The diagnostic record must be documented.	Screening must be repeated annually for drug users whose results were negative if they maintain risky habits.	It is recommended that the centre have access to serological diagnostic tests (anti-HCV) through dried blood or saliva, or that they can perform blood tests by extraction in the centre.	One-step diagnosis is recommended to characterize active HCV infection.	In the event that one-step diagnosis is not available, the virological markers (HCV-RNA or HCV core antigen) must be determined in patients with positive serology and the centre must have a care circuit defined for it.	The necessary means will be made available for monitoring plasma HCV RNA every 12 months in patients already treated to detect reinfection against new exposures to HCV in patients who maintain risky habits.
Justification	It is important to screen for HCV infection in the patient's first consultation at the centre to identify those users not known to be infected or with unavailable information.	The goal is to discard HBV and HIV coinfection in all patients.	The goal is to detect those patients whose previous year result was negative and re-evaluate them in case they have become infected with HCV.	The centre should have access to serological diagnostic tests using dried blood or saliva, or should be able to do blood tests by extraction in the centre.	Carrying out the diagnosis in a single step is recommended as it significantly reduces the patient drop-out for both diagnosis and follow-up.	In those patients with positive serology, virological markers (HCV-RNA or HCV core antigen) must be determined. The centre must have a patient journey defined.	Elimination of infection does not confer protection against new exposures to HCV. For this reason, patients who have already been treated and who maintain risky habits must be monitored to detect reinfections.

Formula	(Number of users who have undergone the HCV test in the first consultation / Number of first consultations carried out) *100.	(Number of users screened for HBV and HIV infection / Number of first consultations made) *100.	(Number of users who have been screened after a negative result the previous year if they maintain risk habits / Total number of users with negative screening the previous year) *100.	Not applicable.	Not applicable.	Number of viremias performed / Number of users with positive serologies. Number of users with positive viremia.	(Number of patients monitored / Number of patients treated) *100. Percentage of reinfections.
Target level	90%	90%	80%	Not applicable.	Not applicable.	80%	80%
Compliance evidence	*Documentary audit:* The centre's screening protocol will be reviewed. *Face-to-face audit:* The screening protocol will be reviewed and clinical records will be audited to check that screening was carried out in the first consultation.	*Documentary audit:* The screening protocol will be reviewed. *Face-to-face audit:* The screening protocol will be reviewed and the medical records will be audited to check that screening was carried out in the first consultation.	*Documentary audit:* The protocol that the centre has implemented will be reviewed. *Face-to-face audit:* The protocol will be reviewed and medical records will be audited to check that screening was carried out.	*Documentary audit:* Documentation will be reviewed to check that the centre has access to serological diagnostic tests using dried blood or saliva, or that they can perform blood tests by extraction in the centre. *Face-to-face audit:* Documentation showing that the centre has access to serological diagnostic tests using dried blood or saliva, or that they can perform blood tests by extraction in the centre, will be reviewed. In addition, clinical records in which these diagnostic tests have been carried out will be audited.	*Documentary audit:* The protocol in which includes the information on one-step diagnosis will be reviewed. *Face-to-face audit:* The protocol will be reviewed and clinical records will be audited to check one-step diagnosis is used.	*Documentary audit:* The care circuit defined by the centre will be reviewed. *In-person audit:* the patient journey will be reviewed and clinical records will be audited to check that virological markers (HCV-RNA or HCV core antigen) are determined in patients with positive serology.	*Documentary audit:* The protocol of the centre will be reviewed. *Face-to-face audit:* The protocol will be reviewed and medical records will be audited to check for monitoring.
Clarifications	This requirement is considered met if the centre offered the test, even if the user did not accept it. A record of the offer must be included in the patient's clinical history. When referring to all drug users, alcohol users are also included.	This requirement is considered met if the centre offered the test, even if the user did not accept it. A record must be included in the patient's clinical history.	In the event of patient drop-out, the annual period from readmission to the most recent treatment will be counted. In the event of a negative screening result (anti-HCV), the test must be repeated annually.	The indicator refers to access to diagnostic tests. The whole blood analysis must incorporate the variables to have a liver profile and to calculate the fibrosis indices. In addition, the centres may optionally measure the following indicators: a) Number of saliva tests carried out / number of people screened. b) Number of dry drop tests carried out / number of people screened. c) GeneXpert number performed/number of anti-HCV positive people tested. d) Number of people screened by point of care test/ number of people screened.	Not applicable.	Patient journey is understood as the algorithm or protocol used by the centre.	Monitoring will be carried out on patients who continue in the centre.
Mandatory / Recommended	Mandatory.	Mandatory.	Mandatory.	Recommended.	Recommended.	Mandatory.	Mandatory.

Note. HBV: Hepatitis B virus; HCV: Hepatitis C virus; HIV: Human immunodeficiency virus.

Table 5
Criterios relacionados con el nivel de tratamiento y seguimiento

Criterion (criterion number in the certification guide)	Patient journey with the hospital specialist (16)	Consensus protocol with gastroenterology/ infection services (17)	Coordination/ monitoring between addiction centre and hospital specialist (18)	Adherence control (users with poor adherence) (19)	Promoting the use of telemedicine (20)	Documentary record of the process (21)	Promoting of hospital or peer support (22)
Criterion definition	All patients diagnosed with hepatitis C must be informed about assessment by the hepatologist or infectious disease specialist and the centre must have a care circuit defined for this.	The centres must have an agreed protocol with the gastroenterology/ infection services and a reference physician.	The addiction centre physician and the viral hepatitis specialist treating the HCV infection must be coordinated and must closely monitor the patient.	In patients whose profile suggests poor compliance, it should be possible to facilitate that the administration of the treatment be directly observed by the health professional of the addiction centre.	The use of telemedicine should be encouraged, both for the relationship between professionals and for the follow-up of patients with difficulties in accessing the hepatologist (consultation with the specialist / patient - doctor of the addiction centre).	Maintenance of a documentary record of the process is recommended from the start until the sustained virological response (SVR) and communication with the addiction centre of the SVR registry are documented.	It is recommended that the figure of hospital companion, facilitator or peer accompaniment be promoted, with the aim of facilitating the care journey of patients who do not normally use classic patient journey.
Justification	The centre must have a defined patient journey with the hospital specialist to refer patients diagnosed with HCV infection for staging and treatment.	In order to improve patient follow-up, the presence of an agreed protocol and reference physician(s) in the gastroenterology/ infection service is recommended.	The objective is that both specialists are coordinated to guarantee treatment and follow-up of the patient.	The objective is to guarantee that patients with poor adherence take medication in the addiction centre.	Telemedicine can make it easier for patients with difficulties in accessing the specialist to be treated in the addiction centre with the virtual support of the specialist doctor.	The purpose of this registry is to facilitate the follow-up of referred and treated patients.	The ultimate goal is to treat the patient. To this end, the centres may promote the figure of hospital companion, facilitator or peer accompaniment, with the aim of facilitating access to the specialist, reducing the isolation of the patient and improving treatment adherence.
Formula	Number of users referred to a hepatologist or infectious disease specialist.	Not applicable.	Number of patients who receive a consultation with the viral hepatitis specialist and are treated.	Number of treatments administered in the centre.	Not applicable.	Not applicable.	Not applicable.
Target level	90%	Not applicable.	80%	Not applicable.	Not applicable.	Not applicable.	Not applicable.
Compliance evidence	*Documentary audit:* It will be checked that the centre has a defined patient journey. *Face-to-face audit:* It will be checked that the centre has a documented patient journey and clinical records will be audited to evidence its implementation.	The agreed protocol with the gastroenterology/ infection services and a document that identifies these doctors as the reference ones will be reviewed.	The centre must indicate the means by which the doctors of the addiction centre and the hepatologist coordinate.	*Documentary audit:* the centre must post the designated dispensing protocol on the platform. *Face-to-face audit:* The designated dispensing protocol will be reviewed and the patient's medical records will be audited.	*Documentary audit:* The protocol that includes remote monitoring of patients will be reviewed.	*Documentary audit:* The evidence of the registry documenting the negative viral load or sustained viral response and communication of the SVR to addiction centre will be reviewed.	The documentation showing that the centre has some figure for patient accompaniment will be reviewed.
Clarifications	This criterion would not apply in those centres that have implemented a protocol in which the hepatitis C specialist is not referred, but rather the patient is treated directly.	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.
Mandatory / Recommended	Mandatory.	Mandatory.	Mandatory.	Recommended.	Recommended.	Recommended.	Recommended.

Note. SVR: Sustained Virological Response.

Discussion

Recent years have seen important advances in the management of addiction centre users with hepatitis C, but there are still a series of barriers to access and a lack of structured tools, agreed upon and endorsed by experts, that certify the correct operation of programs and strategies aimed at reducing HCV infection and reducing unmet needs in this group (Corma-Gómez & Pineda, 2019; Pericàs et al., 2019).

At the international level, a series of studies have reviewed the most important barriers in managing users of addiction or harm reduction centres. A study published in 2017, for example, established an action framework based on a series of epidemiological, health and social indicators and the definition of best practice in harm reduction centres for patients with opioid use disorder or in needle exchange programs, through consensus among a broad group of experts, members of civil society, and associations of users with a history of injecting drug use (Wiessing et al., 2017). In addition, in 2017 the *International Network of Hepatitis in Substance Users* (INHSU) hosted an international panel of experts in drugs and alcohol, infectious diseases and hepatology to discuss an action plan and recommendations regarding the management of people who inject drugs, focused on the elimination of hepatitis C. Six key pillars were established, focused on the provision of services, strengthening of health personnel structures, health information systems, access to technologies with proven quality, safety, efficacy and efficiency, financing of health systems, and leadership/governance (Day et al., 2019). In the other hand, the C-SCOPE study, by means of an electronic questionnaire, assessed the barriers perceived by health professionals related to the diagnosis and treatment of HCV infection in patients with opioid use disorder in substitution treatment, some of which were not applicable in our environment. The most relevant obstacles among them related to the management of hepatitis C were: lack of funding for diagnostic tests for liver disease and access to antiviral treatment, considerable waiting times for accessing specialists in the management of the infection, restrictions regarding reimbursement, lack of peer support programs, problems in referring people with opioid use disorder to specialists, and difficulty in linking diagnosis and health care at the point of patient care (Litwin et al., 2019).

The HepCelentes project has designed a certification program for addiction centres to standardize the management of HCV and improve the care provided to patients with the disease, in line with existing clinical guidelines and recommendations (American Association for the Study of Liver Diseases, 2021; Calleja et al., 2018; Ghany et al., 2020; Pawlotsky et al., 2020), the strategy of the Spanish Health Ministry (Ministerio de Sanidad 2015; 2020a), existing regional plans (Comunidad de Madrid, 2017; Generalitat de Catalunya, 2018; Gobierno de Aragón, 2019; Gobierno de Cantabria, 2020) and the objectives established by the WHO (World Health Organization, 2016). In addition, it aims to contribute to the acquisition of knowledge and the development of best practices among the affiliated centres. The criteria developed in the certification guide for addiction centres were fundamentally based on the recommendations made by scientific societies for the micro-elimination of hepatitis C (Alianza para la Eliminación de las Hepatitis Víricas en España -AEHVE-, 2021; Crespo et al., 2019a; Pineda et al., 2020) at the different levels of action: management, prevention, diagnosis and treatment/monitoring.

Management of drug users mainly takes place in addiction centres. However, most of these centres do not have a specific elimination policy and the necessary means to carry out a complete assessment of patients with hepatitis C, making it necessary to decentralize certain tests and refer these patients to hospital care (Crespo et al., 2019a; Guerra Veloz et al., 2021; Roncero et al., 2017). During this process, some patients are lost on their care journey (Del Pino Bellido et al., 2021). To avoid such patient drop-out, it is necessary to promote the creation of agreed circuits of care that enable patients to be linked to the health care system, coordination mechanisms to be established between addiction centres, primary care and hospital units, and effective information systems to be developed (Macías et al., 2019). Moreover, the possibility of using shared information systems between healthcare centres, such as having a shared clinical history, would help the joint registration of patients and would allow optimal follow-up with updated data on risk groups (Litwin et al., 2019). Similarly, it is necessary that health professionals in addiction centres receive optimal information on the latest clinical evidence in the management of hepatitis C (Samuel, Martinez, Chen, Markatou & Talal, 2018).

Due to the risky habits of the population attending addiction centres, the incidence, transmission of the virus and reinfection among them are high (Antuori et al., 2021; Midgard et al., 2016). To prevent this, it is important to promote information and health education for this group through the implementation of preventive and health promotion plans and programs aimed at reducing risks and avoiding new infections (Alianza para la Eliminación de las Hepatitis Víricas en España -AEHVE-, 2021; Crespo et al., 2019a).

Diagnosis plays a key role in the elimination of hepatitis C. The limited linkage between addiction centre users and the general health care system increases undiagnosed HCV infection (Folch et al., 2021). These risk populations thus need to be screened to provide early diagnosis of the infection. Furthermore, as mentioned above, many patients are lost in the care process meaning that HCV-RNA may not be confirmed after their initial serology for the diagnosis of HCV (Morales-Arráez et al., 2019). In recent

years, the management of hepatitis C has undergone important changes related to the simplification of one-step diagnosis (Crespo et al., 2019b) and the development of new diagnostic techniques for the detection of antibodies or HCV viremia or even the standardization of existing ones by integrating them into the normal hospital diagnostic process (Gómez et al., 2020). All this has facilitated infection screening in outpatient settings, thereby avoiding patient drop-out (Crespo et al., 2021; Gómez et al., 2020; Saludes et al., 2019, 2020). Nevertheless, the risk behaviours associated with this population, as well as the possibility of reinfection or suffering from other infections, indicate that these patients should undergo periodic diagnostic tests (Saludes et al., 2018), not only for the re-assessment of hepatitis C, but also HIV and HBV (in unvaccinated patients) (Martínez-Sanz et al., 2021; Tucker et al., 2017).

The ultimate goal of the process is that users of addiction centres with hepatitis C have access to antiviral treatment, but the lack of defined healthcare circuits or coordination between centres and agreed protocols leads to patients becoming disconnected from health care, thus making access to specialists and subsequent treatment with DAAs difficult (Roncero et al., 2017). In addition, many of these patients, even despite accessing treatment, have poor treatment adherence (Roncero et al., 2012). Linking the diagnosis to an early treatment start directly in the addiction centre (Morales-Arráez et al., 2021) and establishing hospital or peer support programs would thus facilitate access to specialists in the gastroenterology, hepatology or infectious disease services, would reduce patient isolation and improve treatment adherence and persistence (Litwin et al., 2019). Interaction between health professionals, and the lack of access to specialists by addiction centre users, could also be improved through the implementation of regular telemedicine use (Cuadrado et al., 2021; Mateo et al., 2019; Morales Arráez et al., 2021).

Recently, during the early stages and development of the COVID-19 pandemic, it was shown that the delay in diagnosis and treatment of patients with hepatitis C can have a significant impact on the appearance of complications and the increase in hepatic mortality (Buti, Domínguez-Hernández & Casado, 2021). The involvement and collaboration of all the health agents involved in comprehensive care for addiction centre users with hepatitis C through the establishment and definition of standardized quality indicators are thus essential elements for achieving the goal of eliminating hepatitis C in Spain. In this sense, one of the strengths of the HepCelentes project has been the leadership of an organization such as SEDISA as a reviewing and certifying entity on behalf of the managers of social health centres; which has achieved a high degree of consensus among associations, health professionals and other agents involved in dealing with hepatitis C, including the patients themselves, for improving the care provided to addiction centre users with hepatitis C and defining the criteria of the certification guide.

Nevertheless, the project development has a number of limitations. One of these is related to the selection of Steering Committee members. Although the panel comprised a selection of professionals and decision-makers from all fields, based on their scientific and technical knowledge, there was a predominance of health professionals, since they are directly responsible for the management of addiction centre users; other sectors, such as patients, were however also represented. In addition, like any instrument for managing the quality of clinical care, the certification guide will need to demonstrate its value and effectiveness in the control and elimination of HCV infection in addiction centres in routine clinical practice. The HepCelentes project could thus be the starting point for developing a national plan to eliminate hepatitis C in patients with addictions.

Conclusions

In conclusion, addiction centres are a cornerstone in the development of a comprehensive plan for the elimination of hepatitis C. The development of a certification system for these centres that contributes to improving the quality of care for users with hepatitis C, based on the consensus and coordination of multidisciplinary work teams, aims to promote standardization, best practice, management, prevention, diagnosis, treatment, and monitoring of users, supporting international, national and regional strategies aimed at the elimination of hepatitis C.

Acknowledgments

The authors wish to acknowledge the work of Cristina Camuñas, representing the Sociedad Española de Directivos de la Salud (SEDISA), for coordinating the project and Raquel Domínguez, from Pharmacoeconomics & Outcomes Research Iberia (PORIB), for her collaboration in writing and editing the article.

Conflict of interests

All participants in the development of the project were supported by SEDISA, independently of results. Joan Colom declares that he has no conflicts of interest. Marta Torrens has received consultant and/or speaker fees from Gilead, MSD, Servier, Lundbeck and Rovi. Ángeles Rodríguez-Cejas has received fees for presentations from Exeltis, Gilead and Lundbeck and grants to attend training activities from Lundbeck and Gilead. Ignacio Aguilar declares that he has no conflicts of interest. Rocío Álvarez-Crespo has received grants to attend training activities from Gilead and Janssen and fees for participating in Gilead

presentations. Lorenzo Armenteros declares that he has no conflicts of interest. Victoria Ayala and Helena Cantero are employees of Gilead Sciences. Miguel Ángel Casado is an employee of Pharmacoeconomics & Outcomes Research Iberia (PORIB), an independent consultancy specializing in the evaluation of health interventions that has received funding from Gilead Sciences. Javier Crespo declares that he has no conflicts of interest. Joaquín Estévez declares that he has no conflicts of interest. Javier García-Samaniego has received scholarship fees and for participating in Gilead presentations. Manuel Hernández-Guerra has received consultancy fees and grants from Gilead, Abbvie, Bayer, Orphalan, and Intercept. Carlos Mur has received consultancy fees from LUG Healthcare Technology and as a contributor to BD, BMS, Otsuka, Lundbeck and Gilead. Eva Pérez-Bech declares that she has no conflicts of interest. Mercedes Ricote declares that she has no conflicts of interest. Juan A. Pineda has been a beneficiary of grants for research projects from Abbvie, Janssen, Gilead, MSD and ViiV, has received presentation fees from Abbvie, Janssen, Gilead, MSD and ViiV, has received grants to attend training activities from Janssen and Gilead and has done advisory work for Abbvie, Janssen, Gilead and MSD.

References

Alianza para la Eliminación de las Hepatitis Víricas en España (AEHVE). (2021). *Objetivo 2021 propuestas para eliminar la hepatitis C*. https://aehve.org/objetivo-2021/.

American Association for the Study of Liver Diseases. (2021). *HCV Guidance: Recommendations for testing, managing, and treating hepatitis C. Key populations: Identification and management of HCV in people who inject drugs*. https://www.hcvguidelines.org/unique-populations/pwid.

Antuori, A., Montoya, V., Piñeyro, D., Sumoy, L., Joy, J., Krajden, M.,… HepCdetect II Study Group. (2021). Characterization of acute HCV infection and transmission networks in people who currently inject drugs in Catalonia: Usefulness of dried blood spots. *Hepatology*, *74*, 591–606. doi:10.1002/hep.31757.

Buti, M., Domínguez-Hernández, R. & Casado, M. A. (2021). Impact of the COVID-19 pandemic on HCV elimination in Spain. *Journal of Hepatology*, *74*, 1246–1248. doi:10.1016/j.jhep.2020.12.018.

Calleja, J. L., Macias, J., Forns, X., Garcia, F., Berenguer, M., Garcia Deltoro, M.,… Pineda, J. A. (2018). Guía de tratamiento de la infección por virus de la hepatitis C. Asociación Española para el Estudio del Hígado (AEEH). *Gastroenterología y Hepatología*, *41*, 597–608. doi:10.1016/j.gastrohep.2018.07.010.

Comunidad de Madrid. (2017). *Libro blanco de la hepatitis C en la Comunidad de Madrid 2016-2019*. Madrid. http://www.madrid.org/bvirtual/BVCM017974.pdf.

Corma-Gómez, A. & Pineda, J. A. (2019). Infección por el virus de la hepatitis C en España: Desafíos en el camino hacia la eliminación. *Enfermedades Infecciosas y Microbiología Clínica*, *37*, 219-221. doi:10.1016/j.eimc.2019.01.004.

Crespo, J., Albillos, A., Buti, M., Calleja, J. L., García-Samaniego, J., Hernández-Guerra, M.,… Sánchez Antolín, G. (2019a). Eliminación de la hepatitis C. Documento de posicionamiento de la Asociación Española para el Estudio del Hígado (AEEH). *Gastroenterología y Hepatología*, *42*, 579–592. doi:10.1016/j.gastrohep.2019.09.002.

Crespo, J., Eiros Bouza, J. M., Blasco Bravo, A. J., Lázaro de Mercado, P., Aguilera Guirao, A., García, F.,… Calleja Panero, J. L. (2019b). Eficiencia de diversas estrategias para el diagnóstico de la hepatitis C en un solo paso. *Revista Española De Enfermedades Digestivas, 111,* 10-16. doi:10.17235/reed.2018.5810/2018.

Crespo, J., Cuadrado, A., Perelló, C., Cabezas, J., Llerena, S., Llorca, J.,… Calleja, J. L. (2020). Epidemiology of hepatitis C virus infection in a country with universal access to direct-acting antiviral agents: Data for designing a cost-effective elimination policy in Spain. *Journal of Viral Hepatitis*, *27*, 360–370. doi:10.1111/jvh.13238.

Crespo, J., Lázaro, P., Blasco, A. J., Aguilera, A., García-Samaniego, J., Eiros, J. M.,… García, F. (2021). Diagnóstico en un solo paso de la hepatitis C en 2019: Una realidad en España. *Enfermedades Infecciosas y Microbiología Clínica*, *39,* 119–126. doi:10.1016/j.eimc.2020.03.004.

Cuadrado, A., Cobo, C., Mateo, M., Blasco, A. J., Cabezas, J., Llerena, S.,… Crespo, J. (2021). Telemedicine efficiently improves access to hepatitis C management to achieve HCV elimination in the penitentiary setting. *The International Journal on Drug Policy*, *88*, 103031. doi:10.1016/j.drugpo.2020.103031.

Day, E., Hellard, M., Treloar, C., Bruneau, J., Martin, N. K., Øvrehus, A.,… International Network on Hepatitis in Substance Users (INHSU) (2019). Hepatitis C elimination among people who inject drugs: Challenges and recommendations for action within a health systems framework. Liver international: *Official Journal of the International Association for the Study of the Liver*, *39*, 20–30. doi:10.1111/liv.13949.

Del Pino Bellido, P., Guerra Veloz, M. F., Cordero Ruíz, P., Bellido Muñoz, F., Vega Rodríguez, F., Caunedo Álvarez, Á. & Carmona Soria, I. (2021). Chronic hepatitis C patients lost in the system: Predictive factors of non-referral or loss of follow up to Hepatology Units. *Revista Española de Enfermedades Digestivas.* doi:10.17235/reed.2020.7573/2020.

Folch, C., Saludes, V., Reyes-Ureña, J., Antuori, A., Ibáñez, N., Majó, X.,… HepCdetect II Study Group (2021). The hepatitis C care cascade among people who inject drugs accessing harm reduction services in Catalonia:

Major gaps for migrants. *The International Journal on Drug Policy, 90,* 103057. doi:10.1016/j.drugpo.2020.103057.

Generalitat de Catalunya. Departament de Salut. Secretaria de Salut Pública. (2018). *Plan de prevención y control de la hepatitis C en Cataluña*. https://salutpublica.gencat.cat/web/.content/minisite/aspcat/vigilancia_salut_publica/vih-sida-its/04_Hepatitis_viriques/Plan-Hepatitis-Definitivo_C_DEF_ES.pdf.

Ghany, M. G., Morgan, T. R. & AASLD-IDSA Hepatitis C Guidance Panel (2020). Hepatitis C Guidance 2019 Update: American Association for the Study of Liver Diseases-Infectious Diseases Society of America Recommendations for testing, managing, and treating hepatitis C virus infection. *Hepatology*, *71,* 686–721. doi:10.1002/hep.31060.

Gobierno de Aragón. Dirección General de Asistencia Sanitaria. (2019). *Plan estratégico para la eliminación de la hepatitis C en Aragón*. https://www.aragon.es/documents/20127/3827794/PLAN+ESTRAT%C3%89GICO+PARA+LA+ELIMINACI%C3%93N+DE+LA+HEPATITIS+C+EN+ARAG%C3%93N.pdf/6fa98ceb-b31e-db5e-0e5b-0b6e21ac59e1?t=1562230046536.

Gobierno de Cantabria. Servicio Cántabro de Salud. Consejería de Sanidad. (2020). *Estrategia para la eliminación de la hepatitis C en Cantabria*. https://www.scsalud.es/documents/2162705/2163013/Estrategia_eliminacion_Hepatitis_C.pdf/235888b7-589e-b41d-089c-e4ee0ff04d25.

Gómez, L., Reygosa, C., Morales-Arráez, D. E., Ramos, R., Pérez, A., Hernández, A.,… Hernández-Guerra, M. (2020). Evaluación de la precisión diagnóstica del sistema Cobas 6800 para la detección de los niveles de viremia del virus de la hepatitis C a partir de muestras de gotas de sangre seca en papel de filtro. *Enfermedades Infecciosas y Microbiología Clínica*, *38,* 267–274. doi:10.1016/j.eimc.2019.10.009.

Guerra Veloz, M. F., Del Pino Bellido, P., Cordero Ruiz, P., Vega Rodríguez, F., Bellido Muñoz, F., Ramírez de Arellano, E.,… Carmona Soria, I. (2021). HCV microelimination strategies: An interventional study in diagnosed patients without access to the system. *Liver International*, *41,* 928–933. doi:10.1111/liv.14824.

Grebely, J., Hajarizadeh, B., Lazarus, J. V., Bruneau, J., Treloar, C. & International Network on Hepatitis in Substance Users (2019). Elimination of hepatitis C virus infection among people who use drugs: Ensuring equitable access to prevention, treatment, and care for all. *The International Journal on Drug Policy*, *72*, 1–10. doi:10.1016/j.drugpo.2019.07.016.

Grupo técnico de cribado de la infección por el VHC (2021). Screening guide for hepatitis C virus infection in Spain. *Revista Española de Enfermedades Digestivas*, *113,* 81–82. doi:10.17235/reed.2020.7728/2020.

Litwin, A. H., Drolet, M., Nwankwo, C., Torrens, M., Kastelic, A., Walcher, S.,… Grebely, J. (2019). Perceived barriers related to testing, management and treatment of HCV infection among physicians prescribing opioid agonist therapy: The C-SCOPE Study. *Journal of Viral Hepatitis*, *26,* 1094–1104. doi:10.1111/jvh.13119.

Lozano, R., Domeque, N., Perálvarez, C., Torrellas, M. D. & Gonzalo, C. (2019). Mortalidad entre los pacientes en tratamiento con metadona e infectados con el virus de la inmunodeficiencia humana y/o hepatitis C. *Adicciones*, *31,* 78–79. doi:10.20882/adicciones.1007.

Macías, J., Morano, L. E., Téllez, F., Granados, R., Rivero-Juárez, A., Palacios, R.,… HEPAVIR group from the Sociedad Andaluza de Enfermedades Infecciosas (SAEI) and the GEHEP group from the Sociedad Española de Enfermedades Infecciosas y Microbiología (SEIMC) (2019). Response to direct-acting antiviral therapy among ongoing drug users and people receiving opioid substitution therapy. *Journal of Hepatology*, *71,* 45–51. doi:10.1016/j.jhep.2019.02.018.

Martínez-Sanz, J., Vivancos, M. J., Sánchez-Conde, M., Gómez-Ayerbe, C., Polo, L., Labrador, C.,… Pérez-Elías, M. J. (2021). Hepatitis C and HIV combined screening in primary care: A cluster randomized trial. *Journal of Viral Hepatitis*, *28*, 345–352. doi:10.1111/jvh.13413.

Mateo, M., Álvarez, R., Cobo, C., Pallas, J. R., López, A. M. & Gaite, L. (2019). Telemedicine: Contributions, difficulties and key factors for implementation in the prison setting. *Revista Española de Sanidad Penitenciaria*, *21,* 95–105.

Mennini, F. S., Marcellusi, A., Robbins Scott, S., Montilla, S., Craxi, A., Buti, M.,… Kondili, L. A. (2021). The impact of direct acting antivirals on hepatitis C virus disease burden and associated costs in four European countries. *Liver international*, *41,* 934–948. doi:10.1111/liv.14808.

Midgard, H., Weir, A., Palmateer, N., Lo Re, V. 3rd., Pineda, J. A., Macías, J. & Dalgard, O. (2016). HCV epidemiology in high-risk groups and the risk of reinfection. *Journal of Hepatology, 65*, 33–45. doi:10.1016/j.jhep.2016.07.012.

Ministerio de Sanidad. (2015). *Plan Estratégico para el Abordaje de la Hepatitis C en el Sistema Nacional de Salud (PEAHC)*. https://www.mscbs.gob.es/ciudadanos/enfLesiones/enfTransmisibles/hepatitisC/PlanEstrategicoHEPATITISC/docs/plan_estrategico_hepatitis_C.pdf.

Ministerio de Sanidad. (2020a). *Plan Estratégico para el Abordaje de la Hepatitis C en el Sistema Nacional de Salud (PEAHC)*. https://www.mscbs.gob.es/ciudadanos/enfLesiones/enfTransmisibles/hepatitisC/PlanEstrategicoHEPATITISC/docs/Plan_Estrategico_Abordaje_Hepatitis_C_(PEAHC).pdf.

Ministerio de Sanidad. (2020b). *Guía de cribado de la infección por el VHC*. https://www.mscbs.gob.es/ciudadanos/

enfLesiones/enfTransmisibles/sida/docs/GUIA_DE_CRIBADO_DE_LA_INFECCION_POR_EL_VHC_2020.pdf.

Ministerio de Sanidad. (2021). *Plan Nacional sobre Drogas 2021*. https://pnsd.sanidad.gob.es/pnsd/Introduccion/home.htm.

Morales-Arráez, D., Alonso-Larruga, A., Díaz-Flores, F., García Dopico, J. A., de Vera, A., Quintero, E. & Hernández-Guerra, M. (2019). Predictive factors for not undergoing RNA testing in patients found to have hepatitis C serology and impact of an automatic alert. *Journal of Viral Hepatitis, 26,* 1117–1123. doi:10.1111/jvh.13122.

Morales-Arráez, D., Nieto Bujalance, Y., Díaz-Flores, F., de Vera, A., Jiménez, A., García Dopico.,… Hernández-Guerra, M. (2020). Risk of liver fibrosis progression in patients with suboptimal diagnosis of hepatitis C virus infection. *European Journal of Gastroenterology & Hepatology*, *32,* 528–534. doi:10.1097/MEG.0000000000001534.

Morales-Arráez, D., Hernández-Bustabad, A., Medina-Alonso, M. J., Santiago-Gutiérrez, L. G., García-Gil, S., Díaz-Flores, F.,… Hernández-Guerra, M. (2021). Telemedicine and decentralized hepatitis C treatment as a strategy to enhance retention in care among people attending drug treatment centres. *The International Journal on Drug Policy*, *94*, 103235. doi:10.1016/j.drugpo.2021.103235.

Parés-Badell, O., Espelt, A., Folch, C., Majó, X., González, V., Casabona, J. & Brugal, M. T. (2017). Undiagnosed HIV and hepatitis C infection in people who inject drugs: From new evidence to better practice. *Journal of Substance Abuse Treatment*, *77,* 13–20. doi:10.1016/j.jsat.2017.03.003.

Pawlotsky, J. M., Negro, F., Aghemo, A., Berenguer, M., Dalgard, O., Dusheiko, G.,… Wedemeyer, H. (2020). EASL recommendations on treatment of hepatitis C: Final update of the series. *Journal of Hepatology, 73,* 1170–1218. doi:10.1016/j.jhep.2020.08.018.

Pericàs, J. M., Bromberg, D. J., Ocampo, D., Schatz, E., Wawer, I., Wysocki, P.,… Lazarus, J. V. (2019). Hepatitis C services at harm reduction centres in the European Union: A 28-country survey. *Harm Reduction Journal*, *16,* 20. doi:10.1186/s12954-019-0290-x.

Pineda, J. A., Núñez-Torres, R., Téllez, F., Mancebo, M., García, F., Merchante, N.,… HEPAVIR Group of The Andalusian Society of Infectious Diseases (SAEI). (2015). Hepatitis C virus reinfection after sustained virological response in HIV-infected patients with chronic hepatitis C. *The Journal of Infection, 71,* 571–577. doi:10.1016/j.jinf.2015.07.006.

Pineda, J. A., Climent, B., García, F., García Deltoro, M., Granados, R., Gómez, F.,… Morano, L. (2020). Resumen ejecutivo: Documento de consenso de GEHEP, perteneciente a la Sociedad Española de Enfermedades Infecciosas y Microbiología Clínica (SEIMC), junto a SOCIDROGALCOHOL, SEPD y SOMAPA, sobre el manejo de la infección por virus de la hepatitis C en usuarios de drogas. *Enfermedades Infecciosas y Microbiología Clínica*, *38,* 127–131. doi:10.1016/j.eimc.2018.09.006.

Polaris Observatory Collaborators (2021). The case for simplifying and using absolute targets for viral hepatitis elimination goals. *Journal of Viral Hepatitis*, *28,* 12–19. doi:10.1111/jvh.13412.

Rodríguez-Tajes, S., Domínguez, Á., Carrión, J. A., Buti, M., Quer, J. C., Morillas, R. M.,… Lens, S. (2020). Significant decrease in the prevalence of hepatitis C infection after the introduction of direct acting antivirals. *Journal of Gastroenterology and Hepatology*, *35,* 1570–1578. doi:10.1111/jgh.14984.

Roncero, C., Rodríguez-Cintas, L., Barral, C., Fuste, G., Daigre, C., Ramos-Quiroga, J. A. & Casas, M. (2012). Treatment adherence to treatment in substance users referred from Psychiatric Emergency service to outpatient treatment. *Actas Españolas de Psiquiatría*, *40*, 63–69.

Roncero, C., Vega, P., Martínez-Raga, J. & Torrens, M. (2017). Hepatitis C crónica y usuarios con un historial de inyección de drogas en España: Evaluación de la población, retos para un tratamiento efectivo. *Adicciones, 29,* 71–73. doi:10.20882/adicciones.908.

Saludes, V., Folch, C., Morales-Carmona, A., Ferrer, L., Fernández-López, L., Muñoz, R.,… Martró, E. (2018). Community-based screening of hepatitis C with a one-step RNA detection algorithm from dried-blood spots: Analysis of key populations in Barcelona, Spain. *Journal of Viral Hepatitis, 25,* 236–244. doi:10.1111/jvh.12809.

Saludes, V., Antuori, A., Folch, C., González, N., Ibáñez, N., Majó, X.,… HepCdetect II Study Group (2019). Utility of a one-step screening and diagnosis strategy for viremic HCV infection among people who inject drugs in Catalonia. *The International Journal on Drug Policy*, *74,* 236–245. doi:10.1016/j.drugpo.2019.10.012

Saludes, V., Antuori, A., Lazarus, J. V., Folch, C., González-Gómez, S., González, N.,… Martró, E. (2020). Evaluation of the Xpert HCV VL Fingerstick point-of-care assay and dried blood spot HCV-RNA testing as simplified diagnostic strategies among people who inject drugs in Catalonia, Spain. *The International Journal on Drug Policy*, *80,* 102734. doi:10.1016/j.drugpo.2020.102734.

Samuel, S. T., Martínez, A. D., Chen, Y., Markatou, M. & Talal, A. H. (2018). Hepatitis C virus knowledge improves hepatitis C virus screening practices among primary care physicians. *World Journal of Hepatology, 10,* 319–328. doi:10.4254/wjh.v10.i2.319.

Tucker, J. D., Meyers, K., Best, J., Kaplan, K., Pendse, R., Fenton, K. A.,… Easterbrook, P. (2017). The HepTestContest: A global innovation contest to identify approaches to hepatitis B and C testing. *BMC Infectious Diseases*, *17*, 701. doi:10.1186/s12879-017-2771-4.

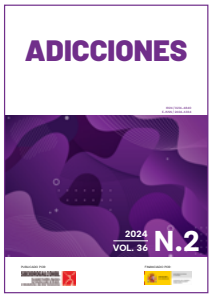
Turnes, J., Domínguez-Hernández, R. & Casado, M. Á. (2017). Value and innovation of direct-acting antivirals: Long-term health outcomes of the strategic plan for the management of hepatitis C in Spain. *Revista Española de Enfermedades Digestivas*, *109*, 809–817. doi:10.17235/reed.2017.5063/201.

Wiessing, L., Ferri, M., Běláčková, V., Carrieri, P., Friedman, S. R., Folch, C.,… Griffiths, P. (2017). Monitoring quality and coverage of harm reduction services for people who use drugs: A consensus study. *Harm reduction journal*, *14*, 19. doi:10.1186/s12954-017-0141-6.

World Health Organization. (2016). *Global health sector strategy on viral hepatitis, 2016–2021: towards ending viral hepatitis*. http://apps.who.int/iris/bitstream/handle/10665/246177/WHO-HIV-2016.06-eng.pdf.

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

ADICCIONES
2024 ■ VOL. 36 ■ N. 2 ■ PAGES 145–154
www.adicciones.es



ORIGINAL

Spanish validation of the Brief Problem Gambling Screen in patients with substance use disorders

Validación al castellano de la escala Brief Problem Gambling Screen en pacientes con Trastorno por Uso de Sustancias

Pedro Serrano-Pérez MD *,**,***,****, Jorge Lugo-Marin PhD *,**,***,****, Raúl Felipe Palma-Álvarez PhD *,**,***,****, Rachel Volberg PhD *****, Susana Jiménez-Murcia ******, Josep Antoni Ramos-Quiroga PhD *,**,***,****, Lara Grau-López, PhD*,**,***,****.

* Department of Psychiatry, Hospital Universitari Vall d'Hebron, Barcelona, España. ** Department of Psychiatry and Forensic Medicine, Universitat Autònoma de Barcelona, Bellaterra, España. *** Group of Psychiatry, Mental Health and Addiction, Vall d'Hebron Institut de Recerca (VHIR), Barcelona, España. **** Biomedical Network Research Centre on Mental Health (CIBERSAM), Madrid, España. ***** School of Public Health and Health Science, University of Massachussetts Amhest, USA. ****** Department of Psychiatry, Hospital Universitari Bellvitge, Barcelona, España. ******* Ciber Fisiopatología Obesidad y Nutrición (CIBERObn), Instituto de Salud Carlos III, Madrid, España.

Abstract

Problematic Gambling or Gambling Disorder (GD) can act by initiating and maintaining the problem of substance addiction. Despite this, there are no rapid screening tools validated in Spanish. The Brief Problem Gambling Screen (BPGS) has proven to be one of the most sensitive tools for detecting GD and populations at risk. This study aims to validate the Spanish version of the original five-item BPGS. A sample of 100 Spanish-speaking adults with substance use disorder were recruited from an addiction treatment center. The participants were administered the Spanish version of BPGS. It showed strong item reliability properties (Ω = 0.93). Sensitivity and specificity values were excellent (0.93 each), also positive (0.7) and negative (0.99) predictive values suggest high discriminant power when compared to non-GD subjects. Statistically significant strong correlation with a gold-standard measure (Problem Gambling Severity Index) was found (r = 0.8, p < 0.01). Similar psychometric properties were found in at-risk gambler patients. In conclusion, the BPGS seems to be an adequate screening instrument in Spanish-speaking clinical population, and also identifies at-risk of GD subjects.

Keywords: problem gambling, gambling disorder, validation, psychometrics, prevalence

Resumen

El juego patológico (JP) puede actuar iniciando y manteniendo el problema de la adicción a sustancias. A pesar de ello, no existen herramientas de cribado rápido validadas en español. La Breve evaluación del juego problemático (BPGS) ha demostrado ser una de las herramientas más sensibles para detectar JP y poblaciones en riesgo. Este estudio tiene como objetivo validar la versión en español de la BPGS original de cinco factores. Se reclutó una muestra de 100 adultos hispanohablantes con trastorno por uso de sustancias de un centro de tratamiento de adicciones. A los participantes se les administró la versión en español de la BPGS. El instrumento mostró propiedades de fiabilidad de los ítems evaluados (Ω = 0,93). Los valores de sensibilidad y especificidad fueron excelentes (0,93 cada uno), también los valores predictivos positivos (0,7) y negativos (0,99) sugieren un alto poder discriminante en comparación con los sujetos sin JP. Se encontró una fuerte correlación significativa con la medida gold-estándar (índice de severidad del juego problemático, PGSI) (r = 0,8, p < 0,01). Se encontraron propiedades psicométricas similares en pacientes en riesgo de JP. En conclusión, la BPGS parece un buen instrumento de cribado en la población clínica española, y también identifica a los sujetos en riesgo de desarrollar JP.

Palabras clave: juego problemático, juego patológico, validación, psicometría, prevalencia

■ *Received: October 2021; Accepted: June 2022.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Pedro Serrano-Pérez. Department of Psychiatry, Hospital Universitari Vall d'Hebron, Barcelona, España. Passeig de la Vall d'Hebron, 119-129, 08035, Barcelona. Tel: +34 93 489 38 80. Fax: +34 93 489 45 87. E-mail: pedro.serrano@vhebron.net; pedrogserrano@gmail.com

Pathological Gambling or Gambling Disorder (GD) is so far the only behavioral addiction recognized in the Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association or DSM-5 (American Psychiatric Association, 2013; Johansson, Grant, Kim, Odlaug & Götestam, 2009) and the ICD- 11 (World Health Organization, 2019). It refers to a condition characterized by a persistent and recurrent maladaptive game pattern that causes personal and social harm to the subject (Dirección General de Ordenación de Juego, 2017). Global prevalence is around 2.3% of the adult population (Parhami, Mojtabai, Rosenthal, Afifi & Fong, 2014). However, in Spain, the incidence is around 0.3-0.6%, with a lifetime prevalence of 0.9% (Dirección General de Ordenación de Juego, 2017; Observatorio Español de las Drogas y las Adicciones, 2020). In recent years, with the increase in online gambling, GD become an even more relevant problem from the social, educational and Public Health relevance point of view (Abbott, 2020).

The negative consequences of GD include the appearance of emotional problems, deterioration of general health, relational conflicts, economic problems, decreased work or academic performance and even the appearance of criminal acts (Langham et al., 2016). Different theoretical models have been described and demonstrate that GD is a heterogeneous and multidimensional disorder. The relationship between substance use and GD is close, causing a worsening of both psychiatric pathology and addiction. Both appear as a result of a complex interaction of genetic, biological, psychological and environmental elements. In all theoretical models, the importance of early identification and offering treatment alternatives to patients at risk or with GD has been highlighted (Blaszczynski & Nower, 2002). Longitudinal studies have even shown that GD predicts the development of alcohol consumption, anxiety or affectivity disorders (Parhami et al., 2014). The prevalence of this association varies greatly depending on the jurisdiction, the life span, the sample type and the instrument used. Systematic reviews, predominantly from the United States, report comorbidity of GD and substance use disorder (SUD) of 57.5% in the general population and up to 22.2% in patients treated in clinical units (Dowling et al., 2018). Various systematic reviews and meta-analyses indicate that gambling problems in patients with SUD are over-represented (10.0%–43.4%) (Cowlishaw, Merkouris, Chapman & Radermacher, 2014; Himelhoch et al., 2015; Lorains, Stout, Bradshaw, Dowling & Enticott, 2014; Manning et al., 2017). Despite this, even in stricter studies, there is evidence of prevalence rates of 14% in PG and 23% if we refer to the entire gambling spectrum (Cowlishaw et al., 2014). In Spain, there are few studies on the prevalence of gambling-related problems in SUD patients despite the fact it occupies one of the first positions of per capita spending in gambling (Becoña, 1996). The little research that exists in our environment, makes a detection instrument even more important to study the true magnitude of the problem. In a study carried out in an outpatient unit for addiction treatment, 20% of treated patients were also found to have a gambling disorder (Pérez, 2010).

In SUD, GD can play a role both in initiating and maintaining or hindering treatment of SUD (Grant & Chamberlain, 2015; Spunt, Lesieur, Liberty & Hunt, 1996). This is an especially vulnerable population due to the poor adherence and the low therapeutic compliance that these patients present (Steinkamp et al., 2019; Zhang, Friedmann & Gerstein, 2003), since the comorbidity of GD and SUD, is associated with an increased risk of presenting other psychiatric disorders when compared with patients without SUD (Abdollahnejad, Delfabbro & Denson, 2014; Cowlishaw & Hakes, 2015). Not correctly identifying GD in patients with SUD could have important consequences such as detriment to adherence, worse prognosis and non-achievement of therapeutic goals (Clausen, Anchersen & Waal, 2008; Zhang et al., 2003).

Outpatient drug addiction centers are an ideal place to identify and properly treat such patients and it is one of the places where the early detection of this pathology should be carried out. Despite this, there is data suggesting that the screening rates carried out by physicians in these services remain very low (Cowlishaw et al., 2014; Holtgraves, 2009). Different barriers have been identified to carry out screening and detection of GD in patients with SUD in these centers, including lack of time, lack of knowledge to carry it out, little information about its effectiveness, the perception that gambling-related problems are not a disease, lack of effective interventions, or limited access to specific treatment units (Dowling et al., 2019; Manning et al., 2017).

Therefore, when it comes to screening, the tool used must be easy and quick to apply since there are many aspects that must be assessed in a clinical interview. Screening instruments can increase clinical care by reducing healthcare costs (Tiet, Finney & Moos, 2008). In recent years, different short screening tools for PG have been developed, most of them derived from more complex measuring instruments (Dowling et al., 2019).

Currently, the Problem Gambling Severity Index (PGSI) is considered the international gold standard (Dellis et al., 2014) and has been replacing other tools that assess prevalence or perform GD screening tests (Calado & Griffiths, 2016; López-González, Estévez & Griffiths, 2018). This instrument has been compared and evaluated with various GD detection instruments (Calado & Griffiths, 2016). However, the PGSI extension can compromise its application for screening in routine clinical practice (Ferris,

Wynne, Ladouceur, Stinchfield & Turner, 2001; Lubman et al., 2017).

Therefore, new instruments have been developed that have the same or even better psychometric properties. There has been different research studying the sensitivity, specificity and overall diagnostic accuracy of different screening instruments with variable and sometimes contradictory results. One of the scales that has shown most interesting results is the Brief Problem Gambling Screen (BPGS) which can be used in 4 different versions including from 2 to 5 items. In a relational study with 837 participants, nine brief screening tools were compared with the PGSI as the reference standard (Calado & Griffiths, 2016), concluding that the only one that showed adequate sensitivity when detecting any level of problem game when compared to the other eight screening tools was the 5-item version of the BPGS (Dowling et al., 2018) also indicating that it could be an optimal tool for use in a clinical population (Lorains et al., 2014). In that study, the 5-item BPGS has shown a sensitivity of 100% and a specificity of 86% for patients with GD. In patients at risk of GD, both the sensitivity and the specificity were 94%. Also positive and negative predictive values showed excellent results (PPV = 70%; NPV = 99%), thus showing strong discriminant power when differentiating with non-GD subjects (Dowling et al., 2018). Its adequate capacity to detect the population at risk was also confirmed, which reinforces the idea that it is a useful tool for early screening in GD. In addition to great sensitivity, its positive predictive value suggested that it is an efficient instrument for detecting patients with any level of gambling disorder. It showed that 93% of the patients identified in the sample used had at least a low risk that was confirmed with the gold standard PGSI, although this decreased to 33% in patients with GD (Dowling et al., 2018). While in some studies the 5-item version appears as the best tool to detect any type of problem with gambling, in other studies its diagnostic accuracy is lower and yet the two-item version does show better results in both the risk population and patients with GD (Browne, Greer, Rawat & Rockloff, 2017). Along these lines, it has been seen that the proportion of gamblers at risk of developing GD is responsible for a large part of the problem, due to the high prevalence that exists. Identifying, therefore, not only the GD but also the populations at risk and being able to act early is another important characteristic of a screening tool (Volberg & Williams, 2011). Despite the ability to diagnose GD and to detect population at risk described, the variability obtained in different samples justifies re-evaluating the scale. Moreover, this is the first study to our knowledge that is carried out in a clinical population with SUD.

Despite having been evaluated as a valuable instrument for early screening in clinical populations, the BPGS has not been validated in Spanish. The fact that it is not validated in Spanish limits its use, the comparison between different studies and if used without adequate validation, can lead to biases (Browne et al., 2017). The main hypothesis of the study is that the Spanish validation of the scale can be successful and useful for its regular use in outpatient addiction centers.

For this reason, the stated objective is the cultural adaptation and validation of 5-item BPGS in Spanish in a population with SUD so that its use and promotion in Spanish-speaking countries or with high rates of Spanish-speaking population are favored.

Methods

Participants

The sample consisted of individuals undergoing treatment for SUD in an outpatient treatment unit in Barcelona. It is one of the reference centers in addiction treatment for years. A convenience sample was recruited by a consecutive sampling method. Thus, given that an objective was to study the prevalence of GD in SUD clinical population, patients were recruited consecutively if they agreed to participate and met the inclusion criteria. The inclusion criteria were 1) age between 18 and 65 years, 2) ability to understand and complete the research questionnaire and 3) willingness to sign the informed consent. The exclusion criteria were 1) presenting a state of intoxication at the time of the interview, 2) decompensation of the psychiatric disorder and 3) not understanding the Spanish language. Since the center belongs to a university hospital, and patients are used to participating in studies, only 15 patients refused to participate. The questionnaire was self-administered in an office where the patient's identity was safeguarded. The sociodemographic characteristics of the sample are represented in Table 1. The protocol was evaluated and accepted by the Ethics and Drug Research Committee of the Vall d´Hebron Hospital. All the participants signed informed consent prior to completing the questionnaires. There was no financial compensation for participation.

Measures

Sociodemographic and clinical variables

The information was obtained using a semi-structured face-to-face interview performed by trained psychologists and psychiatrists and a self-developed questionnaire in which the following sociodemographic variables were registered: age, gender, occupation, academic level, and current situation of coexistence (Table 1).

The *Brief Problem Gambling Screen (BPGS)* (Volberg & Williams, 2011) was developed to identify early gambling problems in the clinical population. It was created by combining certain parameters which were considered the best combination of elements with the power to identify pathological gamblers, problem gamblers and

those at risk of becoming so. It consists of five questions with pathological gambling-related issues in the last 12 months, although it is specified that the time frame may be earlier or even throughout life. An affirmative answer to one or more questions is indicative of a problem with gambling and therefore requires a more detailed assessment (Lubman et al., 2017).

In its elaboration, five items were chosen from a selection of 30 items, of which two items belonged to the Canadian Problem Gambling Index (CPGI) (Items 1 and 3) (Ferris et al., 2001), two belonged to the Problem and Pathological Gambling Measure (PPGM) (Items 8 and 10C) (Williams & Volberg, 2010), and one to the South Oaks Gambling Screen (SOGS) (Item 4) (Holtgraves, 2009; Lesieur & Blume, 1987). Four different versions have been evaluated separately (BPGS-5, BPGS-4, BPGS-3 and BPGS-2).

The *Problem Gambling Severity Index (PGSI)* was created by Ferris et al. (2001). The scale consists of nine items that assess the severity of the GD, five of which assess the negative consequences of the game and four focused on the problem behavior of the gambler (Holtgraves, 2009). Each item is scored on a four-point scale (0-never; 1- sometimes; 2-most of the time; 3- almost always). Scores obtained from the individual items are summed with scores ranging from 0 to 27 used to classify patients' risk levels (0 = non-problematic player with no negative consequences; 1–2 = low risk player. Player experiencing few problems and with few or no negative consequences; 3–7 = moderate risk player. Player experiencing moderate problems with some negative consequences; 8 or more = Problem player). For the present study, the version validated in Spanish was used, which has shown internal consistency above the reliability threshold (α = .97) (Grant & Chamberlain, 2015).

Procedure

The usual procedures to adapt the BPGS to Spanish were carried out. Two of the native Spanish authors of the manuscript independently translated and documented the original English version. The two versions were compared and each difference was discussed until a full agreement was reached. The consensus version in Spanish was sent to an external reviewer (native English) who had previous experience in validating scales. This individual back- translated the tool to identify words that had been translated incorrectly or possible inconsistencies. Necessary corrections were made until there was a full agreement with the external reviewer. This version was corrected by a Spanish gaming expert who runs a reference unit on pathological gambling in the city (Appendix 1).

After signing the informed consent by the participant, the assessment instruments were administered individually. The scale was administered after the visit. It was carried out by two of the researchers, both with previous experience in the use of scales in psychiatry.

Statistical analysis

All analyses were carried out with IBM SPSS 24 software. Item reliability analysis was carried out with an internal consistency analysis (McDonald's Omega). The predictive properties of the scale were determined by obtaining the sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) for each category (GD and at risk of GD). Similarly, for each category, the analysis of convergence of the Spanish-language BPGS with the gold-standard instrument (PGSI) was carried out with Spearman's rank correlation coefficient. The level of statistical significance was set at 0.05. An exploratory factor analysis (EFA) was conducted to study the internal structure of the BPGS. Since the items of the BPGS are dichotomous scores, the factorial analysis was conducted with the tetrachoric correlation matrix, with the software FACTOR (Lorenzo-Seva & Ferrando, 2006). The model was estimated via robust unweighted least squares estimation, which is the recommended procedure in the case of dichotomous scores (Ferrando, Lorenzo, Hernández & Muñiz, 2022). Finally, mean differences analysis was conducted with non-parametric tests, U Mann-Whitney test (for comparison of two groups) and Kruskal-Wallis test (when comparing 3 or more groups).

Data regarding the scales was fully available. Although missing data was less than 5% for sociodemographic variables, a replacement for the average method was used. The level of statistical significance was 0.05.

Results

Table 1 shows the sociodemographic and clinical characteristics of the sample. The total number of participants was 100 Spanish-speaking adults diagnosed with SUD. The sample mean age was 45.83 years (SD= 11.287). Only a quarter of the sample was made up of women (27%). The most prevalent substances under treatment among the participants were alcohol (43%), cocaine (32%) and opiates (19%), with 63% of the participants presenting a second substance under treatment. 21% of the participants presented with psychiatric comorbidity, being depression (10%), anxiety (7%) and schizophrenia (5%) the most prevalent comorbid disorders.

Descriptive statistics and differences by SUD and Gender

Table 2 shows descriptive statistics for the BPGS. In relation to gender, male participants score statistically significant higher in the BPGS when compared with female participants (BPGS: z = -2.43, p = 0.02), with a low effect size (r = 0.24). The Kruskal-Wallis H test indicated that there was not a statistically significant difference in the dependent variable between the different groups ($\chi^2(6)$ = .74, p = .69).

Table 1
Sociodemographic and clinical characteristics of the participants

Participants (N)	100
Female	27
Male	73
Mean age (sd. Range)	45. 83 (11.287. 22-67)
Education level (%)	
Can't read/write	1
Primary	2
Secondary	59
Bachelor/Vocational training	35
University	3
Marital status (%)	
Single	47
Married/Partner	45
Separated/Divorced	8
Employment status (%)	
Active	34
Inactive	28
Sick leave	6
Pensioner/retired	31
Other	1
Main substance in treatment (%)	
Opiates	19
Cocaine	32
Alcohol	43
Cannabis	2
Benzodiazepines	2
Amphetamines	1
Analgesics	1
Second substance in treatment (%)	
Opiates	6
Cocaine	14
Alcohol	24
Cannabis	10
Benzodiazepines	3
Polyconsumption	6
None	37
Psychiatric comorbidity (%)	
Any psychiatric disorder	27
Schizophrenia	5
Schizoaffective disorder	1
Depressive disorder	10
Anxiety disorder	7
ADHD	1
Induced psychosis	3
None	73
Dual pathology (%)	
Yes	21
No	79

Table 2
Descriptive statistics and mean differences test results of the BPGS

	BPGS	**Intergroup differences**
Total Score (mean. sd)	7 (1.53)	
Gender (mean. sd)		
Male	.90 (1.69)	z = -2.43. p = 0.02. r =.24
Female	.15 (.77)	
SUD (mean. sd)		
Opiates	.42 (.96)	χ^2 = .74. p = .69
Cocaine	1.03 (1.91)	
Alcohol	.67 (1.51)	
Cannabis	0 (0)	
Benzodiazepines	0 (0)	
Amphetamines	0 (0)	
Analgesics	0 (0)	

Table 3
Results of the Exploratory Factor Analysis of the BPGS

	Factor 1	**Communality**
BPGS item 1	.99	.99
BPGS item 2	.96	.92
BPGS item 3	.93	.87
BPGS item 4	.97	.95
BPGS item 5	.95	.90

Internal structure of the BPGS

Table 3 shows the results of the EFA. In the final solution, eigenvalues greater than 1 showed the existence of a single factor. This solution explains 94% of the variance. The items present factor loadings greater than .50 and communalities greater than .35. Bartlett's sphericity test was significant (1111.0, df = 10, Sig. = .001) and the Kaiser-Meyer-Olkin sample size adequacy indicator was adequate (.86).

Item reliability analysis

The result obtained in the analysis was $\Omega = 0.93$ for the BPGS was considered to be in the acceptable range ($\Omega > 0.9$ and $\alpha > 0.80$). Likewise, the correlation of each individual item with the total BPGS score reported high values ($r_s = 0.83 - 0.91$), suggesting a relevant contribution of each of the items to the total score. All the items of the BPGS reached good discriminant values (D = .40) (item 1 D = .76; item 2 D = .90; item 3 D = 0; item 4 D = 0; item 5 D = .80).

Predictive value analysis

The Spanish version of the BPGS showed acceptable predictive values to detect GD, with a sensitivity of 0.93 and a specificity of 0.93 for a score equal to or greater than 1. PPV and NPV also showed acceptable values, with a PPV of 0.7 and a NPV of 0.99. The value of the area under the curve was 0.95 (95% CI, 0.87, 1). In at-risk GD, the predictive values were 0.94 and 0.96 for sensitivity and specificity, respectively. The PPV and NPV were 0.85 and 0.99, respectively. The value of the area under the curve was 0.97 (95% CI, 0.91, 1).

Correlation analysis with the PGSI

The BPGS in Spanish language showed a high correlation with the gold-standard assessment instrument (PGSI), with an association value of 0.8 ($p < 0.01$) for GD and 0.9 ($p < 0.01$) for at-risk GD.

Discussion

This is the first study where the BPGS has been tested in a clinical sample of patients with SUD. It is also one of the first studies to try to assess the prevalence of GD in this type of population in Spain. The results obtained in our analyses confirm those obtained in previous studies where the sensitivity and NPV of the test obtained great classifying power to correctly identify and classify both at-risk patients and those with a gambling disorder. Additionally, in our study, we obtain very high values also in specificity and PPV when compared to other similar studies (Manning et al., 2017). In a population with real GD (PGSI => 8), the sensitivity of 93% falls within the range described for the test with 95% confidence and which is between 0.91-0.99 (Volberg & Williams, 2011), although somewhat lower than that found in other studies where a sensitivity of 100% is indicated (Dowling et al., 2018).

When the accuracy of correctly diagnosing patients with GD has been studied, a sensitivity of 99% has been obtained (Dowling et al., 2019). The specificity found in our study (93%) is opposite to that observed in previous studies (Manning et al., 2017). Although it is within the range 0.61-0.99 (95%IC) obtained in the development of the scale, the value is above that obtained when compared with the PGSI (+8) in other studies (Dowling et al., 2018), when compared with other screening scales (Himelhoch et al., 2015) and when its diagnostic capacity obtaining a value of 69% (Dowling et al., 2019).

Although the NPV coincides with that obtained in previous studies, it is noteworthy the great difference found with the PPV in Dowling et al. (2017) of 33%, while in our study it has reached the 70%. Despite this data, when the sample contains the entire spectrum of risk for developing GD the PPV is 93% and is in line with the 85% obtained in our case (Dowling et al., 2018).

When analyzing the screening power in the population at risk of GD, an increase in all the parameters is observed, which coincides with the results indicated by other authors (Dowling et al., 2018; Manning et al., 2017), where a greater power to correctly identify and classify was already identified.

In a recent meta-analysis (Dowling et al., 2019) it is indicated how the BPGS presents greater diagnostic capacity in population at risk than in real GD. In previous studies where the ability to correctly classify patients was also analyzed, they also describe great sensitivity across the entire spectrum of problem gambling and highlight a higher PPV in patients at risk than when seeking to classify only those at high risk (Manning et al., 2017).

It is of great clinical utility to explore the presence of gambling problems from a dimensional perspective that includes from non-problematic gambling, to problematic and pathological gambling, to identify the different levels of severity of the behavior, and thus to be able to apply the programs of specific and personalized treatment to the symptoms of each patient (Himelhoch et al., 2015).

The main strength of this study is that it constitutes one of the first studies carried out in Spain on patients undergoing treatment for SUD on an outpatient basis. Compared to the only study found in a clinical population in our country, the prevalence would be somewhat lower, 15% vs. 20% (Pérez, 2010). In this sense, our results are in line with the stricter studies on prevalence in the general population and somewhat lower if we talk about the entire spectrum of problematic gambling (Himelhoch et al., 2015). As previously explained, although the prevalence in treatment units in countries such as the United States is higher, numerous studies indicate that it seems to be overrepresented (Clausen et al., 2008). Promoting the use of screening tools could help provide reliable data about the prevalence of GD in our country.

As a main limitation of the study, it is worth noting that the clinical service where the data were collected has been treating GD for a relatively short time and that there is a reference GD unit in the city that attends patients from the entire territory. In this sense, the prevalence obtained could be lower than the real one. On the other hand, although the PGSI was used as the gold standard, some authors point out the clinical utility of directly comparing with the DSM-5 diagnostic criteria (Himelhoch et al., 2015). Furthermore, we used one of the methods for the back-translation, however, there are several ways to perform translations of health scales (more than 31 guidelines) (Muñiz, Elosua & Hambleton, 2013; Ortiz-Gutiérrez & Cruz-Avelar, 2018). Moreover, some bias may be present because of the self-assessments. Another limitation of the study is that the sample is mostly made up of men. Although this aspect describes the reality of addiction centers, it is a feature to point out. Finally, it should be noted that the instrument has been validated for the Spanish-speaking population

with SUD, so its use in other clinical populations remains to be evaluated.

Despite the limitations and based on what was previously stated, it can be concluded that the Spanish adaptation of the original five-item BPGS offers correct validity and item reliability in the Spanish-speaking population with SUD. Its great sensitivity in identifying, classifying and diagnosing both the population at risk of developing a GD problem, as well as those who already have it, makes it a very useful screening tool. The inclusion of this instrument in the usual welcome protocols in drug addiction care units could facilitate early detection and facilitate the correct clinical approach.

Conflict of interests

The authors have no conflict of interest to declare in relation to this paper. Dr. Palma-Álvarez has received fees to give talks for Lundbeck, MSD, Mundipharma and Exeltis. Dr. Ramos-Quiroga has received fees as speaker from Janssen-Cilag, Shire, Lilly, Ferrer, Medice and Rubió. He has received research funding from Janssen-Cilag, Lilly, Ferrer, Lundbeck and Rubió. Dr. Grau-López has received fees to give talks for Janssen-Cilag, Lundbeck, Servier, Otsuka, and Pfizer.

The other authors do not have any potential conflict of interest.

The material has not been published in whole or part elsewhere, the paper is not currently considered for publication elsewhere. We declare that all authors have been personally and actively involved in work on the report and will hold themselves jointly and individually responsible for its content.

References

Abbott, M. W. (2020). The changing epidemiology of gambling disorder and gambling-related harm: Public health implications. *Public Health, 184*, 41-45. doi:10.1016/j.puhe.2020.04.003.

Abdollahnejad, R., Delfabbro, P. & Denson, L. (2014). Psychiatric co-morbidity in problem and pathological gamblers: Investigating the confounding influence of alcohol use disorder. *Addictive Behaviors, 39*, 566–572. doi:10.1016/j.addbeh.2013.11.004.

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders.* American Psychiatric Association. (trad. cast. en Barcelona: Masson, 2014). doi:10.1176/appi.books.9780890425596.

Becoña, E. (1996). The problem and pathological gambling in Europe: The cases of Germany, Holland and Spain. *Journal of Gambling Studies, 12*, 179-192. doi:10.1007/BF01539173.

Blaszczynski, A. & Nower, L. (2002). A pathway model of problem and pathological gambling. *Addiction, 7,* 487-499. doi:10.1046/j.1360-0443.2002.00015.x.

Browne, M., Greer, N., Rawat, V. & Rockloff, M. (2017). A population-level metric for gambling-related harm. *International Gambling Studies, 17*, 163–175. doi:10.1080/14459795.2017.1304973.

Calado, F. & Griffiths, M. D. (2016). Problem gambling worldwide: An update and systematic review of empirical research (2000–2015). *Journal of Behavioral Addictions, 5*, 592–613. doi:10.1556/2006.5.2016.073.

Clausen, T., Anchersen, K. & Waal, H. (2008). Mortality prior to, during and after opioid maintenance treatment (OMT): A national prospective cross-registry study. *Drug and Alcohol Dependence, 94*, 151–157. doi:10.1016/j.drugalcdep.2007.11.003.

Cowlishaw, S. & Hakes, J. K. (2015). Pathological and problem gambling in substance use treatment: Results from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *American Journal on Addictions, 24*, 467–474. doi:10.1111/ajad.12242.

Cowlishaw, S., Merkouris, S., Chapman, A. & Radermacher, H. (2014). Pathological and problem gambling in substance use treatment: A systematic review and meta-analysis. *Journal of Substance Abuse Treatment, 46*, 98–105. doi:10.1016/j.jsat.2013.08.019.

Dellis, A., Sharp, C., Hofmeyr, A., Schwardmann, P. M., Spurrett, D., Rousseau, J. & Ross, D. (2014). Criterion-related and construct validity of the Problem Gambling Severity Index in a sample of South African gamblers. *South African Journal of Psychology, 44*, 243–257. doi:10.1177/0081246314522367.

Dirección General de Ordenación de Juego (2017). *Estudio y análisis de los factores de riesgo del trastorno de juego en población clínica española.* Ministerio de Hacienda y Función Pública.

Dowling, N. A., Merkouris, S. S., Dias, S., Rodda, S. N., Manning, V., Youssef, G. J.,… Volberg, R. A. (2019). The diagnostic accuracy of brief screening instruments for problem gambling: A systematic review and meta-analysis. *Clinical Psychology Review, 74,* 101784. doi:10.1016/j.cpr.2019.101784.

Dowling, N. A., Merkouris, S. S., Manning, V., Volberg, R., Lee, S. J., Rodda, S. N. & Lubman, D. I. (2018). Screening for problem gambling within mental health services: A comparison of the classification accuracy of brief instruments. *Addiction, 113*, 1088–1104. doi:10.1111/add.14150.

Ferrando, P. J., Lorenzo, U., Hernández, A. & Muñiz, J. (2022). Decálogo para el análisis factorial de los ítems de un test. *Psicothema, 34*, 7-17. doi:10.7334/psicothema2021.456.

Ferris, J., Wynne, H., Ladouceur, R., Stinchfield, R. & Turner, N. (2001). *The Canadian Problem Gambling Index: Final report.*

Grant, J. E. & Chamberlain, S. R. (2015). Gambling disorder and its relationship with substance use disorders: Implications for nosological revisions and treatment. The *American Journal on Addictions, 24*, 126–131. doi:10.1111/ajad.12112.

Himelhoch, S. S., Miles-Mclean, H., Medoff, D. R., Kreyenbuhl, J., Rugle, L., Bailey-Kloch, M.,… Brownley, J. (2015). Evaluation of brief screens for gambling disorder in the substance use treatment setting. *American Journal on Addictions, 24*, 460–466. doi:10.1111/ajad.12241.

Holtgraves, T. (2009). Evaluating the problem gambling severity index. *Journal of Gambling Studies, 25*, 105–120. doi:10.1007/s10899-008-9107-7.

Johansson, A., Grant, J. E., Kim, S. W., Odlaug, B. L. & Götestam, K. G. (2009). Risk factors for Problematic Gambling: A critical literature review. *Journal of Gambling Studies, 25*, 67–92. doi:10.1007/s10899-008-9088-6.

Langham, E., Thorne, H., Browne, M., Donaldson, P., Rose, J. & Rockloff, M. (2016). Understanding gambling related harm: A proposed definition, conceptual framework, and taxonomy of harms. *BMC Public Health, 16*, 80. doi:10.1186/s12889-016-2747-0.

Lesieur, H. R. & Blume, S. B. (1987). The South Oaks Gambling Screen (SOGS): A new instrument for the identification of Pathological gamblers. *American Journal of Psychiatry, 144*, 1184–1188. doi:10.1176/ajp.144.9.1184.

López-González, H., Estévez, A. & Griffiths, M. D. (2018). Spanish validation of the Problem Gambling Severity Index: A confirmatory factor analysis with sports bettors. *Journal of Behavioral Addictions, 7*, 814–820. doi:10.1556/2006.7.2018.84.

Lorains, F. K., Stout, J. C., Bradshaw, J. L., Dowling, N. A. & Enticott, P. G. (2014). Self-reported impulsivity and inhibitory control in problem gamblers. *Journal of Clinical and Experimental Neuropsychology, 36*, 144–157. doi:10.1080/13803395.2013.873773.

Lorenzo-Seva, U. & Ferrando, P. J. (2006). FACTOR: A computer program to fit the exploratory factor analysis model. *Behavior research methods, 38*, 88-91.

Lubman, D., Manning, V., Dowling, N., Rodda, S., Lee, S. J., Garde, E. L.,… Volberg, R. (2017). *Problem Gambling in People Seeking Treatment for Mental Illness.* Victorian Responsible Gambling Foundation.

Manning, V., Dowling, N. A., Lee, S., Rodda, S., Garfield, J. B. B., Volberg, R.,… Lubman, D. I. (2017). Problem gambling and substance use in patients attending community mental health services. *Journal of Behavioral Addictions, 6*, 678–688. doi:10.1556/2006.6.2017.077.

Muñiz, J., Elosua, P. & Hambleton, R. K. (2013). Directrices para la traducción y adaptación de los tests: Segunda edición. *Psicothema, 25*, 151–157. doi:10.7334/psicothema2013.24.

Observatorio Español de las Drogas y las Adicciones (2020). *Adicciones comportamentales. 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.

Ortiz-Gutiérrez, S. & Cruz-Avelar, A. (2018). Translation and cross-cultural adaptation of health assessment tools. Proceso de traducción y adaptación cultural de instrumentos de medición en salud. *Actas dermo-sifiliograficas, 109*, 202–206. doi:10.1016/j.ad.2017.09.012.

Parhami, I., Mojtabai, R., Rosenthal, R. J., Afifi, T. O. & Fong, T. W. (2014). Gambling and the onset of comorbid mental disorders: A longitudinal study evaluating severity and specific symptoms. *Journal of Psychiatric Practice, 20*, 207–219. doi:10.1097/01.pra.0000450320.98988.7c.

Pérez, E. J. P. (2010). Detección de adicciones comportamentales en adictos a sustancias en tratamiento. *Trastornos Adictivos, 12*, 13–18. doi:10.1016/s1575-0973(10)70005-2.

Spunt, B., Lesieur, H., Liberty, H. J. & Hunt, D. (1996). Pathological gamblers in methadone treatment: A comparison between men and women. *Journal of Gambling Studies, 12*, 431–449. doi:10.1007/BF01539187.

Steinkamp, J. M., Goldblatt, N., Borodovsky, J. T., LaVertu, A., Kronish, I. M., Marsch, L. A. & Schuman-Olivier, Z. (2019). Technological interventions for medication adherence in adult mental health and substance use disorders: A systematic review. *JMIR Mental Health, 6*, e12493. doi:10.2196/12493.

Tiet, Q. Q., Finney, J. W. & Moos, R. H. (2008). Screening psychiatric patients for illicit drug use disorders and problems. *Clinical Psychology Review, 28*, 578–591. doi:10.1016/j.cpr.2007.08.002.

Volberg, R. A. & Williams, R. J. (2011). *Developing a brief problem gambling screen using clinically validated samples of at-risk, problem and pathological gamblers.* https://www.uleth.ca/dspace/handle/10133/2561.

Williams, R. J. & Volberg, R. A. (2010). *Best practices in the population assessment of problem gambling. Guelph: Ontario Problem Gambling Research Centre.* https://www.researchgate.net/publication/228420596_Best_Practices_in_the_Population_Assessment_of_Problem_Gambling.

World Health Organization (2019). *International Statistical Classification of Diseases and Related Health Problems (11th ed.; ICD-11).*

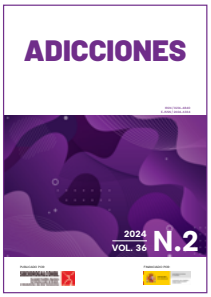
Zhang, Z., Friedmann, P. D. & Gerstein, D. R. (2003). Does retention matter? Treatment duration and improvement in drug use. *Addiction, 98*, 673–684. doi:10.1046/j.1360-0443.2003.00354.x.

Appendix 1. Spanish version of Brief Problem Gambling Screen.

Test	Preguntas	Sí	No
PPGM10	En los últimos 12 meses, ¿Dirías que has estado preocupado por el juego o las apuestas?		
CPGI3	En los últimos 12 meses, ¿Has necesitado apostar crecientes cantidades de dinero para obtener el mismo grado de emoción?		
SOGS4	En los últimos 12 meses, ¿Has apostado durante más tiempo, mayor cantidad de dinero o con mayor frecuencia de lo que pretendías inicialmente?		
PPGM8C	En los últimos 12 meses, ¿Has hecho intentos de reducir, controlar o detener las apuestas?		
CPGI5	En los últimos 12 meses, ¿Has pedido prestado dinero o vendido algo para obtener más dinero para jugar o apostar?		

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

ADICCIONES
2024 ■ VOL. 36 ■ N. 2 ■ PAGES 155–166
www.adicciones.es



ORIGINAL

Efficacy of a treatment program based on positive psychology for drug use in juvenile offenders

Eficacia de un programa de tratamiento en el consumo de drogas en menores infractores desde la psicología positiva

Álvaro Fernández Moreno*, Natalia Redondo Rodríguez**, José Luis Graña Gómez***.

* Universidad Francisco de Vitoria, España.
** Universidad Autónoma de Madrid, España.
*** Universidad Complutense de Madrid, España.

Abstract

One of the factors that increase the likelihood of adolescents starting to exhibit and consolidate anti-social behavior is drug use, with a consistent pattern of consumption of different substance found in young offenders (Aebi, Bessler & Steinhausen, 2021). A cognitive-behavioral group treatment program inspired by the positive psychology approach was developed and applied to drug use in minors deprived of liberty (experimental group); the results were compared to those of a group of adolescents with the same type of drug use in the same center (active control group) at two points in time: during and after incarceration. The fall in the rate of problems associated with drug use after incarceration in the experimental group was statistically significant compared to the control group, and the effect size of the experimental condition was large ($\hat{\eta}^2 = 0.55$), much higher than the control group ($\hat{\eta}^2 = 0.16$). The treatment program has proven to be an effective tool for reducing problems associated with drug use and is especially effective in reducing alcohol and cannabis consumption.

Keywords: young offender, drug use, treatment, cognitive-behavioral, positive psychology

Resumen

Uno de los factores que aumentan en mayor medida la probabilidad de que los adolescentes inicien y consoliden comportamientos antisociales es el consumo de drogas, encontrándose un patrón consistente de consumo de diferentes sustancias en los menores infractores (Aebi, Bessler y Steinhausen, 2021). Para la redacción del presente trabajo se desarrolló y aplicó un programa de tratamiento, de corte cognitivo – conductual e inspirado en el enfoque de la psicología positiva, para el consumo de drogas en menores de edad privados de libertad (grupo experimental). Los resultados se compararon con los de un grupo de adolescentes con la misma tipología de consumo internos en el mismo Centro (grupo control activo) en dos momentos, durante y tras el internamiento. El grupo experimental redujo de manera estadísticamente significativa la tasa de problemas asociados al consumo de drogas en comparación con el grupo control tras el internamiento, siendo el tamaño del efecto de la condición experimental elevado ($\hat{\eta}^2 = 0{,}55$), mucho mayor que el del grupo control ($\hat{\eta}^2 = 0{,}16$). El programa de tratamiento ha mostrado eficacia para la reducción de problemas asociados al consumo de drogas, siendo especialmente eficaz en la reducción del consumo de alcohol y de cannabis.

Palabras clave: menor infractor, consumo de drogas, tratamiento, cognitivo-conductual, psicología positiva

■ *Received: November 2021; Accepted: June 2022.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Álvaro Fernández Moreno. Carretera M-515 de Pozuelo a Majadahonda, Km. 1,800, 28223, Pozuelo de Alarcón, Madrid.
Email: alvaro.fernandezmor@ufv.es

In recent decades, the scientific community has shown a particular interest in the study of juvenile criminal behaviour (Bonta & Andrews, 2017; Roncero, Andreu & Peña, 2018). One of the main objectives in this type of research has been to determine the factors that increase the probability of adolescents initiating and consolidating antisocial behaviours. It seems clear that there is no single explanation for this phenomenon, so that there are multiple factors linked to criminal behaviour, this being in most cases the result of dynamic interactions between several variables (Barnert et al., 2021; Pérez & Ruiz, 2017; Simoes, Matos & Batista-Foguet, 2008). One of the variables that has received the most attention is drug use, given its possible relationship and/or reciprocal influence on this type of behaviour. Drugs and antisocial behaviour in adolescence are frequently associated (Aebi et al., 2021; López & Rodríguez-Arias, 2012; Mulvey, Schubert & Chassin, 2010), with findings showing a consistent pattern of different substances being used by juvenile offenders (Pérez & Ruiz, 2017). The literature seems to indicate that there is a clear link between drug use and antisocial behaviour, and that such substance use is more likely if the antisocial behaviour begins during childhood and persists during adolescence (Brislin et al., 2021).

In Spain, the Organic Law 5/2000, of January 12, which governs the criminal responsibility of minors, requires that treatment programs be applied with the greatest possible guarantees of effectiveness. Similarly, it provides the juvenile courts with different tools to deal with offending behaviour: provisions for the benefit of the community, detention measures, therapeutic incarceration, day centre attendance, probation measures or outpatient treatment, among other (Bujosa, González, Martín & Reifarth, 2021; Lázaro-Pérez, 2001).

Over the last 30 years, alternative intervention models to deprivation of liberty have gained much ground in treating drug use in people who have concurrently developed antisocial behaviour (Delen, Zolbanin, Crosby & Wright, 2021), including the adolescent population. The United States has a long tradition in the early approach to problems linked to drug use in adolescents with offending behaviours through outpatient interventions, and specific intervention courts for drug use have been in operation since the 1990s (Ledgerwood & Cunningham, 2019).

Despite the extensive scientific output regarding this type of intervention program, there are still issues to be resolved, such as the analysis of the effectiveness of different types of programs based on different conceptual frameworks (Ali, Benjamin & Fondacaro, 2022). Tripodi, Bender and Litschge (2010) carried out a meta-analysis to assess the efficacy of interventions based on legal measures with adolescents who presented problematic alcohol use. The aim of the analysis was to compare the efficacy of family-based interventions versus the efficacy of individual-based interventions. According to the results of this analysis, all interventions aimed at reducing alcohol use seemed to be successful, and the interventions with the greatest effects were cognitive-behavioural therapy integrated with the 12-step method (Tomlinson, Brown & Abrantes, 2004), the brief motivational interview (D'Amico, Miles, Stern & Meredith, 2008), follow-up after the intervention combined with cognitive behavioural therapy (Kaminer, Burleson & Burke, 2008) and multidimensional family therapy (Liddle et al., 2001).

In a more recent similar meta-analysis, Tripodi and Bender (2011) compared ten studies assessing the efficacy of alcohol and marijuana treatments for juvenile offenders. This study also revealed that the effects of individual-based interventions were weaker among juvenile offenders, while family-based programs showed more effective results approaching the levels of efficacy obtained in the non-offender population. Along the same lines, Dopp, Borduin, White and Kuppens (2017) stated that family-based treatments could reduce the social and economic consequences of crimes committed by adolescents. Similarly, family intervention-based treatments for juvenile offenders produced moderate but lasting effects over time (Dopp et al., 2017).

Some recent and relevant studies in this field are, for example, that of Tanner-Smith, Steinka-Fry, Hensman Ketrey and Lipsey (2016), who found no statistically significant differences between family therapy, motivational therapy or cognitive behavioural therapy in the efficacy of drug use treatment in juvenile offenders, with substance use of the participants significantly decreasing after entering any treatment. Mean reductions were greater for multi-substance users ($g\bar{g}$ = 0.63) and for marijuana use ($g\bar{g}$ = 0.36). Mean reductions were not significant for alcohol consumption ($g\bar{g}$ = 0.22).

In Spain, studies focusing on the assessment of the influence of drug use on the origin and maintenance of criminal behaviour have repeatedly found consistent patterns of use involving different substances in juvenile offenders (San Juan, Ocáriz & Germán 2009; Uceda-Maza, Navarro-Pérez & Pérez-Cosín, 2016; Vega-Cauich & Zumárraga-García, 2019). Although there is no separate juvenile tribunal in Spain, local juvenile courts have been applying therapeutic measures as alternatives to incarceration for years. After an exhaustive search, no studies were found that measured the efficacy of such interventions in an open environment. There is a similar lack of studies in incarceration contexts, whether open, semi-open or closed, assessing not only the effectiveness of the interventions but also the sociodemographic characterization of adolescents with high drug use who commit serious crimes. The most relevant study in this field was carried out by Esteban et al. (2002), involving a final sample of 251 minors from 26 detention centres. Contreras,

Molina and Cano (2012) carried out a study of the prevalence of drug use in juvenile offenders in the Province of Jaen, while Uceda-Maza et al. (2016) did the same in the Community of Valencia. These studies concluded that the prevalence of drug use in offending minors was higher than in the normal population. In addition, it can be highlighted that not only the prevalence is greater but also the seriousness of the problems associated with drug use in the offending population. Finally, it can be concluded that there are significant differences between offending minors and the normal population in the propensity to abuse substances (Bonta & Andrews, 2017).

In the process of searching for scientific evidence of the efficacy of treatment programs for drug use in juvenile delinquents, no programs based on the positive psychology paradigm were found, despite the fact that these approaches have proven effective in reducing antisocial behaviours (Riffo-Allende, 2021). Positive psychology is a general paradigm aimed at refocusing research, prevention and clinical practice perspectives on the individual's general resources and strengths (Carrea & Mandil, 2011; Fernández-Ríos & Vilariño Vázquez, 2018). Intervention programs explicitly based on positive psychology are aimed at promoting positive emotions and reinforcing well-being resources and experiences (Santamaría-Cárdaba, 2018; Toribio, González-Arratia, Van Barneveld & Gil, 2018). Studies carried out in positive psychology have led to the conclusion that promoting the development of adolescence in a context of well-being reduces the likelihood that psychopathology is generated (Bohlmeijer, Bolier, Lamers & Westerhof, 2017). A fundamental strategy of interventions based on positive psychology is the formation of an adequate orientation towards the future, defined by the presence of realistic aspirations, suitable expectations and the promotion of planning skills. Future orientation has been shown to be a relevant factor in the positive design of youth development, even for young people with a long history of serious antisocial behaviour and high drug use (Brooks, Miller, Abebe & Mulvey, 2018). Therefore, there is an urgent need to use the positive psychology paradigm to propose systematized interventions that offer alternatives to adolescents in acquiring a higher level of resilience and more efficiently preventing the appearance of negative emotions, particularly in a population presenting antisocial behaviours (Giménez, Vázquez & Hervás, 2010).

Due to the scarcity of studies on the prevalence of drug use in Spanish juvenile offenders and the absence of studies measuring the effectiveness of interventions carried out in the Spanish population, this study had four objectives. The first was the sociodemographic description of adolescents who are serving a custodial sentence for committing serious crimes and who have a heavy pattern of drug use. The second objective was the development of an intervention program adapting techniques which are based on positive psychology and which have proven effective. The third objective was to assess the effectiveness of the intervention developed for treating drug use in the population of offending adolescents who have committed serious crimes. This intervention has been implemented and developed in the Centro de Ejecución de Medidas Judiciales Teresa de Calcuta (CEMJTC) (Teresa of Calcutta Correctional Facility) of the Community of Madrid. Finally, the relationship between the application of the program and criminal recidivism was measured since, as mentioned above, there is a link between drug use and the origin and maintenance of antisocial behaviours (Aebi et al., 2021), with the expectation that a lower rate of recidivism will be found after the application of the program in comparison to the control condition.

Method

Participants

Participants in this study were 92 CEMJTC inmates jailed for committing serious crimes between 2015 and 2017 and released between 2016 and 2019. Average participant age at the start of their sentence was 16.97 years. All were men since the four women initially present were eliminated from the study given the small sample size. More than half the sample were of foreign nationality (60.9%). Most participants came from a dysfunctional family (61.6%). Within dysfunctional families, the most frequent problem was economic factors (47.5%), followed by relational problems (30.2%), multi-problem families (29.2%), delinquency (22.7%) and substance use (16.2%). A very high rate of school dropout (61.04%), absenteeism (75.21%) and academic failure (85.2%) was found. Almost 90% of the participants had a dissocial relationship group, frequently belonging to violent youth groups.

Most of the crimes committed by the participants were of a violent nature, affecting property (81.5%). Prior to imprisonment, 33.7% of the participants had previously completed a jail sentence and 65.2% had committed more than one crime, facts that show how deep-rooted the antisocial behaviour of the study participants was.

Measures

Teen-Addiction Severity Index (T-ASI) (Kaminer, Bukstein & Tarter, 1991).

The T-ASI is a brief structured interview designed to provide important information about aspects of the patient's life that may contribute to the substance abuse and/or dependence syndrome.

In the interview, the therapist asks about the seven potential problem areas during the month up to the evaluation. These areas include: drugs, school, employment/support, family, peers/social life, law, and psychiatry. Based on the information provided, three scales

are completed: the self-assessment scale, the severity scale for the interviewer, and the validity scale.

In its Spanish adaptation, the T-ASI presents excellent validity in its substance abuse scale. The score obtained in this dimension correlates directly with the use of any type of substance (*Rho* = 0.90) as well as with the problems generated (*Rho* = 0.69) (Díaz & Castro-Fornieles, 2008). The reliability of the application of the T-ASI test in the present study was adequate, with a Cronbach's alpha of 0.84 being obtained.

Youth Level of Service/Case Management Inventory (YLS/CMI) (Hoge, 2010).

The adaptation to the Spanish population (IGI-J) (Garrido, López & Galvis, 2017) was used in the present study. The IGI-J consists of 42 items grouped into 8 risk/protection factors called criminal history, school record, formal education/employment, peer group, drug use, leisure and entertainment, personality and behaviour, and attitudes, values, and beliefs. These risk/protection factors are assessed through the information obtained in interviews with the minor and information obtained from other sources. The Spanish adaptation has adequate reliability, with a Cronbach's alpha of 0.90. The predictive validity analysis yielded a value of 0.71, which confirms its good predictive capacity, correctly identifying 66.7% of repeat offenders and 68.8% of non-reoffenders in terms of criminal behaviour (Garrido et al, 2017). The reliability of the application of the IGI-J test in the present study was adequate, obtaining a Cronbach's alpha of 0.79.

Consultation of legal files

The legal files were analysed to collect information on criminal recidivism during the follow-up period and sociodemographic information of the study participants.

Procedure

This study assessed the effectiveness the Educational and Therapeutic Intervention Program for Drug Use in Juvenile Offenders (PTCD) through a longitudinal quasi-experimental design of repeated measures.

The sample was divided into two groups, one experimental and one active control. The selection of the quasi-experimental design was determined by the non-random assignment of each participant to each experimental condition. The criterion for assigning the groups was the possibility being able to continuously carry out all the activities proposed in the program (some inmates had difficulties doing so due to the activities being incompatible with other activities carried out during incarceration or due to the duration of the measure).

The experimental group was made up of 52 CEMJTC inmates who participated in the PTCD and were released, with a minimum of 12 months follow-up. The active control group was made up of 40 inmates of the CEMJTC who did not complete the PTCD and were referred to external resources for psychoeducation activities and individual cognitive behavioural therapy for the treatment of drug use, and were released, with at least 12 months follow-up. As a requirement for inclusion in the study, all participants, both in the control and experimental groups, had to score 4 or more on the interviewer's drug use severity scale in the T-ASI test.

In order to verify the homogeneity of experimental and control groups, and to control the effect of variables that could confound the results, a series of statistical analyses were carried out. First, the relationship between experimental or control group membership with sociodemographic variables was assessed. No significant differences were found according to the educational level attained at admission ($\chi^2_{(4)} = 8.09$, $p = .08$), nationality ($\chi^2_{(3)} = 2.06$, $p = .63$), type of sentence ($\chi^2_{(2)} = 2.32$, p = .32) and type of crime committed ($\chi^2_{(5)} = 5.04$, p = .46). Similarly, different quantitative variables measured at the start of the jail sentence that could have an effect on the results were evaluated, with no statistically significant differences being found in age ($t_{(91)} = -1.74$; $p = .085$), or the use of alcohol ($t_{(91)} = -1,31$; $p = .19$), cannabis ($t_{(91)} = 0.03$; $p = .97$), cocaine ($t_{(91)} = 0.41$; $p = .67$), ecstasy ($t_{(91)} = 0.64$; $p = .52$), inhalants ($t_{(57.39)} = -1.52$; $p = .13$), benzodiazepine ($t_{(91)} = 0.45$; $p = .64$), heroin ($t_{(51)} = 1.76$; $p = .08$), school record ($t_{(91)} = -1.51$; $p = .13$), leisure and entertainment ($t_{(91)} = -0.53$; $p = .59$), education and work ($t_{(91)} = 1.61$; $p = .11$), personality and behaviour ($t_{(91)} = 1.85$; $p = .06$), problems associated with drug use ($t_{(91)} = 0.32$; $p = .75$), school problems ($t_{(91)} = -1.50$; $p = .13$), social problems ($t_{(91)} = -0.82$; $p = .41$) and legal problems ($t_{(91)} = 0.90$; $p = .36$).

A longitudinal design of repeated measures was chosen, given the two different time points (at the start of the jail sentence in the CEMJTC and after release) at which the data obtained from the application of the YLS/CMI and the T-ASI were analyzed. Recidivism was assessed using legal records one year after each inmate's release.

The first step of the treatment process was an assessment of each inmate using the T-ASI and YLS/CMI tests. Once the technical team had questioned the inmates, they were assigned to treatment in either the control or experimental condition.

Experimental condition

Once the minor was included in the program, the treatment groups were set up, with the number of participants and the rhythm of treatments adapted to the characteristics of the minors involved. Individuals with the greatest need of support were placed in groups of between five and seven members, and those with an adequate level of literacy and command of Spanish were in groups of eight to ten adolescents. The average number of participants per

group was 8.5 subjects. The group program consisted of 27 sessions of an hour and a half, with a periodicity of two sessions per week. The program was applied by a psychologist with extensive training in the treatment of addictions in adolescents with social conflict.

The theoretical foundation of the program is of a cognitive behavioural character, but at the time of application, the therapist based the intervention on the positive psychology paradigm, providing the participants with options for change rooted in positive and non-punitive messages. One of the main objectives of the intervention was to generate positive emotions in connection with the plan for personal change, thus breaking the learned helplessness frequently shown by participants, caused by previous treatment failures. This intervention model requires the therapist to see each participant as a unique and valuable human being, prioritizing the development of change options from protective factors and the resources of each individual. Risk factors, criminal behaviour and drug use are approached as dynamic variables that do not determine their future behaviour nor burden them with an indissoluble antisocial identity.

The treatment program was structured in eight modules. The first module, Information, aims to generate a therapeutic bond with the participants. At the same time, during the three sessions that make up this module, the restructuring of irrational beliefs is promoted through psychoeducation activities, addressing myths, long-term consequences of drug use and the relationship between use and escalation of antisocial behaviour. Once the therapeutic link is generated, the second module, Becoming aware, begins; in the three sessions of this module, participants write up a coherent and sincere description of their drug use pattern, identifying its functionality. Similarly, the impact of having a low-risk perception of drug use is addressed. This is followed by the third module, also comprising three sessions. In Restructuring my beliefs, the consequences of my drug use, the participants carry out activities to identify both motivations and consequences of their previous drug use patterns. The key aim of these first three modules is to enable adolescents, through activities aimed at reflection that avoid judgment and reproach, to connect the variables involved in the origin and maintenance of their drug use behaviour.

In the three sessions of Module 4, Phases and processes of change, psychoeducation activities are carried out so that the participants learn about the stages of change proposed in the Transtheoretical Model (DiClemente & Prochaska, 1982). Introspection activities are then implemented to help participants integrate this knowledge through a study of their life experiences, thereby generating a sense of control over the treatment process.

Module 5, My options for change, has three sessions to encourage the identification of the emotions experienced, especially those of social support, happiness, illusion, failure, loneliness or guilt. Participants are then asked to project them into a hypothetical future in two different scenarios, treatment success and drug use maintenance. For this purpose, narrative techniques supported by the use of drawing are implemented. After this, participants are invited to decide which change option they will follow on release from jail.

Once the tasks aimed at strengthening the motivation to change are completed, participants are provided with sufficient strategies to reduce the problems associated with drug use, thus reinforcing an appropriate orientation towards the future, a fundamental strategy within the positive psychology paradigm (Brooks et al., 2018). To this end, Module 6 trains participants to modify the lifestyle associated with drug use habits. The module is made up of four sessions in which, after first discussing the concept of lifestyle in general, each participant is asked to identify risk and protective factors, prosocial and antisocial motivations and commitments in their earlier lifestyle. Each participant is then helped to draft a personal change plan built and supported by their potentialities, protection factors and prosocial motivations and commitments.

To reinforce the plan for personal change, Module 7, Psychological detoxification and desire management, provides training in strategies for managing the desire to consume drugs. This module is made up of five sessions, in the first of which psychoeducation techniques are carried out to identify the desire to consume. The second session, behavioural techniques, focuses on breathing exercises and progressive relaxation. In the third session, cognitive techniques, strategies for thought suppression, alternative thinking, decision-making balance and problem solving are trained, while the fourth session, assertiveness techniques, trains strategies for managing social situations in which the participant needs to maintain their stance of abstinence in the company of a group of peers who are continuing their consumption behaviours. In the last session, Integration of the intervention, role-play techniques are used to practise the automatization of the strategies acquired.

Finally, during the three sessions that make up Module 8, Relapse prevention, the risk of drug use relapse is defined in practical terms, strategies are trained for the identification of risk factors and signs of relapse, and a personal risk plan is drawn up.

Active control condition

This group includes those inmates who were not able to take part in the activities designed in the experimental condition (due to incompatibility with the other activities carried out during their prison term or due to the duration of the measure) and who were referred for drug use treatment to community resources such as the Integrated Drug Dependency Care Centres (CAID) or the Drug

Dependency Care Centres (CAD), where they participated in individual cognitive-behavioural psychotherapy activities.

Data analysis

All statistical analyses were performed using the statistical package SPSS 21.0.

To describe the sample, analyses of frequencies and percentages were carried out. Regarding treatment efficacy, the variation between pre-treatment and post-treatment in those dependent variables measured by the T-ASI test was measured. For this purpose, a two-factor ANOVA with repeated measures in one factor was performed with each of the variables, with the intergroup factor being group membership (experimental vs. control) and the intragroup factor being time of assessment (pre-treatment vs. post-treatment). For each group, the effect size (partial eta squared) of these differences was also obtained.

Finally, to analyze the data on recidivism, Pearson's chi-square tests were carried out.

Results

Data analysis revealed a strong presence of multiple risk factors for drug use in both the control group and the experimental group. An extreme problem with drug use was reported by 88.2% (n = 81) of the participants, while 60.9% (n = 56) had an extreme problem at school, 37% (n = 34) had an extreme problem at work or in making a living, 66.3% (n = 61) had an extreme family environment problem, and 75% (n = 69) had an extreme problem with their closest circle of friends.

Regarding the type of substance use, the two substances that stood out as being most frequently consumed in the sample were cannabis and alcohol. Compulsive cannabis use was presented by 85.9% of the participants, and 64.1% presented alcohol abuse (see Table 1). Cocaine was also frequently consumed, with 22.8% of participants using abusively, 13% occasionally and 21.7% reporting experimental use.

The main objective of this research was to assess the possible reduction of problems associated with drug use in PTCD participants. To measure the effect of the intervention, the results of the longitudinal study of participants in treatment, the experimental group, were compared to those of a group of participants with the same characteristics who did not receive the treatment, the control group.

The results of the statistical analyses allow the conclusion to be drawn that on the scale measuring problems with drug use in the T-ASI test, the effects of the group factor ($F_{(1,90)}$ = 11.87; p <.01; η^2 = 0.11), time factor ($F_{(1,90)}$ = 105.16; p <.001; η^2 = 0.53) and the interaction between both ($F_{(1,90)}$ = 14.54; p <.001, η^2 = 0.13) were significant, as can be seen in Table 2.

Subsequently, the rate of change found in the two experimental conditions was assessed. In the problems associated with the drug use variable, there was a statistically significant reduction between pre- and post-treatment use for both the control group ($F_{(1,90)}$ = 18.35; p <.001; η^2 = 0.16) and the experimental group ($F_{(1,90)}$ = 113.8; p <.001; η^2 = 0.55). However, the effect size of the intervention program in the experimental group was much larger than that of the control group (η^2 = 0.55 vs η^2 = 0.16), as can be seen in Table 3.

The next step in the research was to determine the substances for which the intervention was most effective. Statistical analyses were performed on the substance-by-substance reduction in use. In the alcohol use variable, the effect of the group factor was significant ($F_{(1,90)}$ = 18.63; p <.001; η^2 = 0.17), the effect of the time of assessment factor was also significant ($F_{(1,90)}$ = 43.57; p <.001; η^2 = 0.32), as was the effect of the interaction ($F_{(1,90)}$ = 10.74; p <.01; η^2 = 0.10) (see Table 4). Similarly, in the cannabis use variable, the effect of the group factor was significant ($F_{(1,90)}$ = 4.49; p <.05; η^2 = 0.04), as was the effect of the time of assessment ($F_{(1,90)}$ = 65.89; p <.001; η^2 = 0.42) and the interaction effect ($F_{(1,90)}$ = 7.97; p < .05, η^2 = 0.06) (see Table 4). In the cocaine use variable, only the effect of the time of assessment factor was significant ($F_{(1,90)}$ = 53.17; p <.001; η^2 = 0.37), which also occurred in the use of ecstasy variable ($F_{(1,90)}$ = 15.20; p <.001; η^2 = 0.14) (Table 4).

After analyzing the results yielded by the *F* tests for the main effects of the group and time of assessment factors, as well as for the effect of their interaction, we analyzed the interaction between group and time of assessment through post-hoc comparisons subsequent to applying the Bonferroni test.

A statistically significant reduction in alcohol use was observed both in the control group ($F_{(1,90)}$ = 4.88; p <.05; η^2 = 0.05) and in the experimental group ($F_{(1,90)}$ = 56.11; p <.001; η^2 = 0.38); the same applied to cannabis use, where the reduction was statistically significant in both experimental conditions, in the control group ($F_{(1,90)}$ =

Table 1
Prevalence of drug use in participants (%)

Substance	Abstinent	Experimental	Occasional	Abusive	Compulsive
Alcohol	0	5.4	25	64.1	5.4
Cannabis	1.1	3.3	2.2	7.6	85.9
Cocaine	41	21.7	13	22.8	1.1
Ectasy	78	5.4	7.6	8.7	0
Inhalants	90	2.2	4.3	1.1	2.2
Benzodiazepines	96.7	2.2	1.1	0	0
Heroin	96.7	3.3	0	0	0

Table 2
Severity index group means in the different areas measured by the T-ASI test in pre- and post-treatment, effect size of the program for each group and results of the ANOVA on these means

Groups	T-ASI Drugs Pre	T-ASI Dr Post
Control (n = 40)	4.85 ± 0,36	3.93 ± 1.10
Experimental (n = 52)	4.88 ± 0,38	2.88 ± 1.48

Group: $F_{(1,90)}$ = 11.87; p **= 0.001**;** η^2 = 0.116

Time of assessment: $F_{(1,90)}$ = 105.16; p **= 0.000***;** η^2 = 0.539

Group × Time of assessment: $F_{(1,90)}$ = 14.54; p **= 0.000***;** η^2 = 0.139

Note. The data correspond to the mean ± standard deviation (SD).
*p<.05 **p<.01 ***p<.001

Table 3
Pre- and post-treatment changes in patient groups

	Control (n = 40)	Experimental (n = 52)
	Change (pre-post)	Change (pre-post)
T-ASI Drugs	**0.92***** $F_{(1,90)}$= 18.35*** η^2 = 0.16	**2***** $F_{(1,90)}$= 113.80*** η^2 = 0.55

Note. The values of the columns indicate the difference between means of pre- and post-treatment in each one of the subscales. η^2 = partial eta square.
*p<.05 **p<.01 ***p<.001.

Table 4
Drug use group means in pre- and post-treatment, effect size of the program for each group and results of the ANOVA on these means

Groups	Alcohol use Pre	Alcohol use Post
Control (n = 40)	2.85 ± 0.59	2.45 ± 0.65
Experimental (n = 52)	2.59 ± 0.69	1.48 ± 1.15

Group: $F_{(1,90)}$ = 18.63; p **= 0.000***;** η^2 = 0.172

Time of assessment: $F_{(1,90)}$ = 43.57; p **= 0.000***;** η^2 = 0.326

Group × Time of assessment: $F_{(1,90)}$ = 10.74; p **= 0.001**;** η^2 = 0.107

Groups	Cannabis use Pre	Cannabis use Post
Control (n = 40)	3.72 ± 0.67	2.72 ± 1.41
Experimental (n = 52)	3.75 ± 0.81	1.91 ± 1.62

Group: $F_{(1,90)}$ = 4.49; p **= 0.037*;** η^2 = 0.048

Time of assessment: $F_{(1,90)}$ = 65.89; p **= 0.000***;** η^2 = 0.423

Group × Time of assessment: $F_{(1,90)}$ = 7.977; p **= 0.018*;** η^2 = 0.060

Groups	Cocaine use Pre	Cocaine use Post
Control (n = 40)	1.12 ± 1.13	0.33 ± 0.66
Experimental (n = 52)	1.26 ± 1.31	0.24 ± 0.63

Group: $F_{(1,90)}$ = 0.28; p = 0.86; η^2 = 0.00

Time of assessment: $F_{(1,90)}$ = 53.17; p **= 0.000***;** η^2 = 0.371

Group × Time of assessment: $F_{(1,90)}$ = 0.87; p = 0.35; η^2 = 0.010

Groups	Ecstasy use Pre	Ecstasy use Post
Control (n = 40)	0.32 ± 0.76	0.0 ± 0.0
Experimental (n = 52)	0.57 ± 1.09	0.15 ± 0.48

Group: $F_{(1,90)}$ = 2.90; p = 0.092; η^2 = 0.031

Time of assessment: $F_{(1,90)}$ = 15.20; p **= 0.000***;** η^2 = 0.145

Group × Time of assessment: $F_{(1,90)}$ = 0.25; p = 0.61; η^2 = 0.003

14.45, p <.001, η^2 = 0.13) and in the experimental group ($F_{(1,90)}$ = 63.61, p <.001, η^2 = 0.41). Similarly, there were significant reductions in cocaine use in both the control ($F_{(1,90)}$ = 17.88; p <.001; η^2 = 0.16) and experimental groups ($F_{(1,90)}$ = 38.90; p <.001; η^2 = 0.30). Finally, it is noteworthy that the reduction in ecstasy use both in the control group ($F_{(1,90)}$ = 5.10; p <.05; η^2 = 0.05) and in the experimental group ($F_{(1,90)}$ = 11.13, p <.01, η^2 = 0.11) was also statistically significant (Table 5).

The effect size of the experimental condition was much larger than that of the control condition for all measured variables. For alcohol use, the comparison was η^2 = 0.38 vs. η^2 = 0.05, for cannabis η^2 = 0.41 vs. η^2 = 0.13, for cocaine η^2 = 0.30 vs. η^2 = 0.16 and for ecstasy η^2 = 0.11 vs. η^2 = 0.05 (Table 5).

Finally, an analysis was carried out with the aim of finding differences between the control and experimental groups based on the criminal recidivism variable. For the statistical analyses, a contingency table was made and the chi-square test was used.

As shown in Table 6, 28.8% of the participants in the experimental group reoffended compared to 37.5% in the control group. Despite the fact that the experimental group had a lower recidivism rate, there were no statistically significant differences in criminal recidivism based on membership of the control group or the experimental group ($\chi^2_{(1)}$ = 0.77, p = .38).

Table 5
Changes in use between pre- and post-treatment in each group of patients

	Control (n = 40)	**Experimental (n = 52)**
	Change (pre-post)	**Change (pre-post)**
Alcohol use	**0.34*** $F_{(1,90)}$= 4.88* η^2 = 0.05	**1.11***** $F_{(1,90)}$= 56.11*** η^2 = 0.38
Cannabis use	**1***** $F_{(1,90)}$= 14.45*** η^2 = 0.13	**1,84***** $F_{(1,90)}$= 63.61*** η^2 = 0.41
Cocaine use	**0.79***** $F_{(1,90)}$= 17.88*** η^2 = 0.16	**1.27***** $F_{(1,90)}$= 38.90*** η^2 = 0.30
Ecstasy use	**0.32*** $F_{(1,90)}$= 5.10* η^2 = 0.05	**0.42**** $F_{(1,90)}$= 11.13** η^2 = 0.11

Note. The values of the columns indicate the difference between means of pre- and post-treatment in each one of the subscales. η^2 = partial eta square. *p<.05 **p<.01 ***p<.001.

Table 6
Criminal recidivism and group

	Control group	**Experimental group**	$\chi^2_{(1)}$
Recidivists (n= 30)	15 37.5% (C.R. = 0.9)	15 28.8% (C.R. = -0.9)	0.77 *p* =.38
Non-recidivists (n= 62)	25 62.5% (C.R. = -0,9)	37 71.2% (C.R. = 0.9)	

Note. C.R. = corrected residuals.

Discussion

The PTCD implemented at the CEMJTC within the positive psychology paradigm is an effective tool for the treatment of drug use, abuse and dependence in young people serving a custodial sentence, especially involving problems derived from the use of alcohol and cannabis. The size of the intervention effect in reducing problems associated with drug use measured by the T-ASI test is large (η^2 = 0.55), with large effect sizes found in the reduction of cannabis (η^2 = 0.41) and alcohol use (η^2 = 0.38) after incarceration.

The notable contribution of this program is to offer an intervention model based on the positive psychology approach, crystallizing into a model that provides each participant with options for change based on positive and non-punitive messages. In this intervention model, the therapist sees each participant as a unique and valuable being, and focuses on generating options for change based on protective factors and the resources of the individual, addressing risk factors, criminal behaviours and drug use as variables that do not determine their future behaviour nor burden them with an indissoluble antisocial identity. The techniques applied, mainly cognitive-behavioural, have been adapted from well-established and approved intervention models with the intention of consolidating an adequate future orientation.

Interventions shown to be effective in the population of adolescents without problems with the law have not obtained similarly good results in the population of those that have committed crimes and have entered the juvenile justice system; this indicates that changing drug use behaviours in juvenile offenders is more complex when a risk factor as powerful as antisocial behaviour is also involved (Tripodi & Bender, 2011). Given this premise, the results of the study acquire greater relevance since they not only show some evidence of the usefulness of the PTCD but also that the techniques are suited to a problem and a population that is so complex to address. The results of the present study suggest that PTCD is a useful tool for reducing alcohol, cannabis, cocaine and ecstasy use after imprisonment. Similarly, incarceration in the CEMJTC seems to operate within a therapeutic community so that, together with

individual cognitive-behavioural psychological treatment, the rates of alcohol, cannabis, cocaine and ecstasy use after imprisonment are reduced in a statistically significant manner.

In order to determine whether the PTCD is a tool at the level of those already used in other settings, it was compared with the data obtained by Waldron and Turner (2008) in their meta-analysis. They examined effect sizes in pre- and post-treatment in three types of intervention: individual cognitive-behavioural therapy, group cognitive-behavioural therapy and family therapy in non-criminal population. The results of the meta-analysis indicated that the mean effect size of the programs evaluated using Cohen's *d* statistic was 0.45, which is an average effect size. The size of the effect of the intervention in this study, measured through the problems associated with drug use variable using the T-ASI test was $\eta^2 = 0.55$, which suggests that the intervention's effect size was high.

Another important contribution of the PTCD is its special effectiveness in reducing alcohol and cannabis use after imprisonment; in these substances, the effect of interventions on juvenile offenders has been limited, as in the case of cannabis, or even insignificant, as in the case of case of alcohol (Tanner-Smith et al., 2016).

Finally, it should be noted that criminal recidivism was lower in the experimental group (28.8%) than in the control group (37.7%), although this difference was not statistically significant. It is highly probable that these results were mediated by the effect of not having carried out a randomized study with a control group without treatment, which would have made it possible to measure the impact of non-intervention versus the new intervention proposal.

Beyond the limitations of the quasi-experimental model used, we found certain variables in which it was not possible to intervene, or which were not assessed, and which would have been of interest. These include the cognitive variables involved in the change processes of the study participants. The availability of this information would have made it possible to discuss not only the effectiveness of the program but also which cognitive processes were most enhanced in adolescents during the intervention.

Another limitation was the impossibility of carrying out a systematized family intervention with the study sample that would accompany the group dynamics. Family intervention is one of the fundamental actions implemented in the CEMJTC, yet the great diversity of the families of origin and the impossibility of working with a significant number of them (they are in the countries of origin and do not speak Spanish) prevented the PTCD modules being applied as part of family intervention. As previously mentioned, family therapy has shown particular efficacy in the treatment of problems linked to drug use in juvenile offenders (Dopp et al., 2017; Hartnett, Carr, Hamilton & O'Reilly, 2017; Tanner-Smith et al., 2016; Tripodi & Bender, 2011). For this reason, it would be of considerable interest for future studies to be able to see how family intervention might contribute to strengthening the results obtained by the PTCD.

Similarly, the quasi-experimental methodology and the lack of an experimental group without treatment meant that it was not possible to compare the effect size of the intervention. In future research, the use of experimental methodology would increase the scope of the conclusions. These limitations are difficult to overcome in a context in which the well-being of the individual being treated must be prioritized.

Looking ahead, it seems of interest that future research evaluates the variables contributing to the results obtained in this study. It would thus be essential to expand our knowledge of the cognitive processes that have made the impact of the program possible, especially in reducing alcohol and cannabis use after imprisonment. Similarly, it would be very interesting to apply the PTCD in open-environment sentences, such as compliance with probation or community service, in order to measure the impact of the PTCD in community contexts where criminal behaviour has not yet become chronic.

Acknowledgments

To the Agency for the Reeducation and Reintegration of Juvenile Offenders of the Community of Madrid for its constant efforts to offer its users opportunities for change.

To the GINSO Association in its commitment to developing innovative programs that allow comprehensive intervention models to be created.

To everyone on the CEMJ Teresa de Calcutta technical team, its educators, guards, controllers, TAI and its coordination and management team, for making this research possible with their effort and trust.

To Francisco de Vitoria University, with special mention to Jesús Rodríguez Barroso, for his support during the writing of this article.

Conflict of interests

There are no conflicts of interest related to the present study entitled Efficacy of a treatment program based on positive psychology for drug use in juvenile offenders.

References

Aebi, M., Bessler, C. & Steinhausen, H. C. (2021). A cumulative substance use score as a novel measure to predict risk of criminal recidivism in forensic juvenile male outpatients. *Child Psychiatry & Human Development, 52*, 30-40. doi:10.1007/s10578-020-00986-7.

Ali, Y., Benjamin, A. C. & Fondacaro, M. R. (2022). Treatment of juvenile offenders: Toward multisystemic risk and resource management. In E. Jeglic & C.

Calkins (Eds.*) Handbook of Issues in Criminal Justice Reform in the United States.* New York: Springer, Cham. doi:10.1007/978-3-030-77565-0_26.

Barnert, E. S., Perry, R., Shetgiri, R., Steers, N., Dudovitz, R., Heard-Garris, N. J. & Chung P. J. (2021). Adolescent protective and risk factors for incarceration through early adulthood. *Journal of Child and Family Studies, 30*, 1428–1440. doi:10.1007/s10826-021-01954-y.

Bonta, J. & Andrews, D. A. (2017). *The psychology of criminal conduct* (6th ed.). New York, NY: Routledge. doi:10.4324/9781315677187.

Bohlmeijer, E. T., Bolier, L., Lamers, S. M. A. & Westerhof, G. J. (2017). Intervenciones clínicas positivas: ¿Por qué son importantes y cómo funcionan? *Papeles del Psicólogo, 38*, 34-41. doi:10.23923/pap.psicol2017.2819.

Bujosa, L. M., González, I., Martín, F. & Reifarth, W. (2021). *Menores y justicia Juvenil*. Navarra, España: Editorial Aranzadi.

Brislin, S. J., Clark, D. A., Heitzeg, M. M., Samek, D. R., Iacono, W. G., McGue, M. & Hicks, B. M. (2021). Co-development of alcohol use problems and antisocial peer affiliation from ages 11 to 34: Selection, socialization and genetic and environmental influences. *Addiction, 116*, 1999-2007. doi:10.1111/add.15402.

Brooks, M., Miller, E., Abebe, K. & Mulvey, E. (2018). The observed longitudinal relationship between future orientation and substance use among a cohort of youth with serious criminal offenses. *Substance Use & Misuse, 53*, 1925-1936. doi:10.1080/10826084.2018.1441311.

Carrea, G. & Mandil, J. (2011). Aportes de la psicología positiva a la terapia cognitiva infantojuvenil. *PSIENCIA. Revista Latinoamericana de Ciencia Psicológica*, *3*, 40–56.

Contreras, L., Molina, V. & Cano, M. C. (2012). Drug abuse in adolescent offenders: Analysis of the psychosocial variables involved Madrid. *Adicciones, 24*, 31-38. doi:10.20882/adicciones.115.

D'Amico, E., Miles, J., Stern, S. & Meredith, L. (2008). Brief motivational interviewing for teens at risk of substance use consequences: A randomized pilot study in a primary care clinic. *Journal of Substance Abuse Treatment, 35*, 53–61. doi:10.1016/j.jsat.2007.08.008.

Delen, D., Zolbanin, H. M., Crosby, D. & Wright, D. (2021). To imprison or not to imprison: An analytics model for drug courts. *Annals of Operations Research, 303*, 101–124. doi:10.1007/s10479-021-03984-7.

Díaz, R. & Castro-Fornieles, J. (2008). Clinical and research utility of Spanish Teen-Addiction Severity Index (T-ASI). *Addictive Behaviors, 33*, 188–195. doi:10.1016/j.addbeh.2007.06.002.

DiClemente, C. C. & Prochaska, J. O. (1982). Self change and therapy change of smoking behavior: A comparison of processes of change in cessation and maintenance. *Addictive Behaviors, 7*, 133-142. doi:10.1016/0306-4603(82)90038-7.

Dopp, A. R., Borduin, C. M., White, M. H. II & Kuppens, S. (2017). Family-based treatments for serious juvenile offenders: A multilevel meta-analysis. *Journal of Consulting and Clinical Psychology, 85*, 335–354. doi:10.1037/ccp0000183.

Esteban, B., Díaz, A., Gañan, A., García, J., Gordon, B. & Varela, C. (2002). *Menores infractores con consumo de drogas en los centros de reforma*. Madrid, España: Servicio Interdisciplinar de Atención a las Drogodependencias (SIAD).

Fernández-Ríos, L. & Vilariño Vázquez, M. (2018). Historia, investigación y discurso de la Psicología Positiva: Un abordaje crítico. *Terapia psicológica, 36*, 123-133. doi:10.4067/S0718-48082018000200123.

Garrido, V., López, E. & Galvis, M. J. (2017). Predicción de la reincidencia con delincuentes juveniles: Adaptación del IGI-J. *Revista sobre la infancia y la adolescencia, 12*, 30-41. doi:10.4995/reinad.2017.6484.

Giménez, M., Vázquez, C. & Hervás, G. (2010). El análisis de las fortalezas psicológicas en la adolescencia: Más allá de los modelos de vulnerabilidad. *Psychology, Society, & Education, 2*, 97-116. doi:10.25115/psye.v2i2.438.

Hartnett, D., Carr, A., Hamilton, E. & O'Reilly, G. (2017). The effectiveness of functional family therapy for adolescent behavioral and substance misuse problems: A meta-analysis. *Family Process, 56*, 607-619. doi:10.1111/famp.12256.

Hoge, R. D. (2010). Youth level of service/case management inventory. In R. K. Otto & K. S. Douglas (Eds.), *Handbook of violence risk assessment* (pp. 81–95). Routledge/Taylor & Francis Group.

Kaminer, Y., Burleson, J. & Burke, R. (2008). Efficacy of outpatient aftercare for
adolescents with alcohol use disorders: A randomized controlled study. *Journal of the American Academy of Child and Adolescent Psychiatry, 47*, 1405–1412. doi:10.1097/CHI.0b013e318189147c.

Kaminer, Y., Bukstein, O. & Tarter, R. E. (1991). The teen-addiction severity index: Rationale and reliability. *International Journal on Addiction, 26*, 219-26. doi:10.3109/10826089109053184.

Lázaro-Pérez, M. C. (2001). Análisis de la Ley Orgánica 5/2000, reguladora de la responsabilidad penal del menor. *Anuario de Psicología Jurídica,11*, 99-117.

Ledgerwood, D. M. & Cunningham, P. B. (2019). Juvenile drug treatment court. *Pediatric clinics of North America, 66*, 1193–1202. doi:10.1016/j.pcl.2019.08.011.

Liddle, H., Dakof, G., Parker, K., Diamond, G., Barrett, K. & Tejeda, M. (2001). Multidimensional family therapy for adolescent drug abuse: Results of a randomized clinical trial. *American Journal of Drug and Alcohol Abuse, 27*, 651–688. doi:10.1081/ADA-100107661.

López, S. & Rodríguez-Arias, J. L. (2012). Risk and protective factors for drug use and antisocial

behavior in Spanish adolescents and young people. *International Journal of Psychological Research*, *5*, 25-33. doi:10.21500/20112084.746.

Mulvey, E. P., Schubert, C. A. & Chassin, L. (2010). *Substance use and delinquent behavior among serious adolescent offenders.* Washington, DC: Office of Juvenile Justice and Delinquency Prevention.

Pérez, E. & Ruiz, S. (2017). El consumo de sustancias como factor de riesgo para la conducta delictiva: Una revisión sistemática. *Acción Psicológica,14*, 33-50. doi:10.5944/ap.14.2.20748.

Riffo-Allende, G. (2021). Evaluación de una intervención basada en la psicología positiva, para la disminución de conductas antisociales en adolescentes. *International Journal of Developmental and Educational Psychology INFAD Revista de Psicología, 1*, 359-370. doi:10.17060/ijodaep.2021.n1.v2.2119.

Roncero, D., Andreu, J. M. & Peña, M. E. (2018). Efecto de diferentes patrones de agresión sobre la desadaptación institucional y la reiteración delictiva en menores infractores. *Revista Española de Investigación Criminológica*, *16*. doi:10.46381/reic.v16i0.159.

San Juan, D., Ocáriz, E. & Germán, I. (2009). Menores infractores y consumo de drogas: Perfil psicosocial y delictivo. *Revista Criminalidad, 51,* 147-162.

Santamaría-Cárdaba, N. (2018). Educando para el desarrollo y la ciudadanía global a través de la psicología positiva. *Revista Electrónica de Investigación y Docencia Creativa, 7,* 98-109. doi:10.30827/Digibug.50004.

Simoes, C., Matos, M. & Batista-Foguet, J. M. (2008). Juvenile delinquency: Analysis of risk and protective factors using quantitative and qualitative methods. *Cognition, Brain, Behavior: An Interdisciplinary Journal, 12*, 389-408.

Tanner-Smith, E. E., Steinka-Fry, K. T., Hensman Kettrey, H. & Lipsey, M. W. (2016). *Adolescent substance use treatment effectiveness: A systematic review and meta-analysis.* Nashville, TN: Peabody Research Institute, Vanderbilt University.

Tomlinson, K., Brown, S. & Abrantes, A. (2004). Psychiatric comorbidity and substance use treatment outcomes of adolescents. *Psychology of Addictive Behaviors, 18,* 160–169. doi:10.1037/0893-164X.18.2.160.

Toribio, L., González-Arratia, N., Van Barneveld, H. & Gil, M. (2018). Positive mental health in Mexican adolescents: Differences by sex. *Revista Costarricense de Psicología, 37*, 131-143. doi:10.22544/rcps.v37i02.03.

Tripodi, S. & Bender, K. (2011). Substance abuse treatment for juvenile offenders: A review of quasi-experimental and experimental research. *Journal of Criminal Justice, 39*, 246–252. doi:10.1016/j.jcrimjus.2011.02.007.

Tripodi, S., Bender, K. & Litschge, C. (2010). Interventions for reducing adolescent alcohol abuse: A meta-analytic review. *Archives of Pediatric and Adolescent Medicine, 164*, 85–91. doi:10.1001/archpediatrics.2009.235.

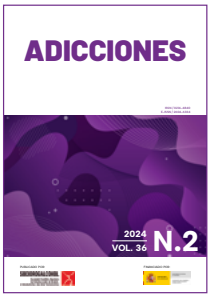
Uceda-Maza, F. X., Navarro-Pérez, J. J. & Pérez-Cosín, J. V. (2016). Adolescentes y drogas: Su relación con la delincuencia. *Revista de Estudios Sociales. 58*, 63-75. doi:10.7440/res58.2016.05.

Vega-Cauich, J. I. & Zumárraga-García, F. M. (2019). Variables asociadas al inicio y consumo actual de sustancias en adolescentes en conflicto con la ley. *Anuario de Psicología Jurídica, 29,* 21-29. doi:10.5093/apj2018a13.

Waldron, H. B. & Turner, C. W. (2008). Evidence-based psychosocial treatments for adolescent substance abuse. *Journal of Clinical Child & Adolescent Psychology, 37,* 238–261. doi:10.1080/15374410701820133.

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

ADICCIONES
2024 ■ VOL. 36 ■ N. 2 ■ PAGES 167–176
www.adicciones.es



ORIGINAL

Gambling advertising and gambling behavior in Spanish adolescents and young adults

Publicidad de apuestas y conducta de juego en adolescentes y adultos jóvenes españoles

Sergio Pérez-Gonzaga*, Daniel Lloret Irles*, Víctor Cabrera Perona*.

* Universidad Miguel Hernández de Elche, España.

Abstract

The profits obtained by the gambling industry in Spain represent almost one point of GDP and the proportion of minors who have gambled has reached a quarter. This situation occurs despite the law regulating gambling, which included among its objectives the prevention of addictive behaviors, as well as the protection of minors and other vulnerable groups. Recently, an additional regulation was approved to control gambling advertising. Bearing in mind the new regulatory context, we analyze the relationship between advertising and gambling in adolescents and young adults, studying especially young people who have already gambled and minors. We conducted an empirical investigation with a sample of 2,181 adolescents and young adults who filled out a questionnaire on gambling and advertising. We found that the variables associated with advertising are significantly related to gambling behavior and that, in addition, this correlation occurs with greater magnitude in men. We obtained higher scores in advertising influence among those subjects who have ever gambled compared to those who have not, highlighting the importance of discouraging the arrival of new gamblers. Regarding minors, we found significant differences in the different variables of advertising influence compared to young adults. These findings point to the need to evaluate this influence considering the new habits and interests of minors today.

Keywords: gambling, adolescent, young adults, advertising, gambling behavior

Resumen

Los beneficios obtenidos por la industria del juego de apuestas en España representan casi un punto del PIB y el porcentaje de menores de edad que han debutado en el juego alcanza la cuarta parte. Esta situación se produce pese a la ley de regulación del juego que incluye entre sus objetivos la prevención de conductas adictivas, así como la protección de menores y otros grupos vulnerables. Recientemente se ha aprobado un reglamento que regula la publicidad sobre apuestas. Teniendo presente el nuevo contexto normativo, analizamos la relación entre publicidad y apuestas en adolescentes y adultos jóvenes, estudiando la vulnerabilidad de jóvenes que ya han debutado en el juego y menores de edad. Realizamos una investigación empírica con una muestra de 2.181 adolescentes y adultos jóvenes que rellenaron un cuestionario sobre juego y publicidad. Encontramos que las variables asociadas a la publicidad se relacionan significativamente con la conducta de juego y que, además, esta correlación se da con mayor magnitud en hombres. Obtenemos mayores puntuaciones en influencia publicitaria entre aquellos sujetos que han jugado alguna vez frente a los que no, concluyendo la importancia de frenar el debut de nuevos jugadores. En cuanto a los menores, encontramos diferencias significativas en influencia publicitaria frente a los mayores. Estos hallazgos señalan la necesidad de evaluar la influencia teniendo en cuenta los nuevos hábitos e intereses de los menores en la actualidad.

Palabras clave: juego de apuestas, adolescentes, adultos jóvenes, publicidad, conducta de juego

■ *Received: September 2021; Accepted: July 2022.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Sergio Pérez-Gonzaga. Universidad Miguel Hernández de Elche, España.
Email: sperezgonzaga@gmail.com

The profits obtained by the gambling industry in Spain represent 0.8% of GDP. In 2019, real gambling revenue (the difference between the amounts bet and the prizes paid out) was €10,226 million, 3.6% more than the previous year. Gambling contributed €1,707.3 million to state tax income (Dirección General de Ordenación del Juego DGOJ, 2019; DGOJ, 2020; Gómez-Yáñez & Lalanda-Fernández, 2020).

Abundant literature is available on the influence of advertising on gambling behaviour (Deans, Thomas, Daube, Derevensky & Gordon, 2016; Deans, Thomas, Daube & Derevensky, 2017; López-González & Tulloch, 2015; López-González, Guerrero-Solé & Griffiths, 2018; Thomas, Lewis, McLeod & Haycock, 2012). The results of different studies suggest that advertising presents a normalized impression of gambling behaviour, in addition to generating a positive attitude towards gambling and a favourable social perception (King, Delfabro & Griffiths, 2010; Parke, Harris, Parke, Rigbye & Blaszczynski, 2015; Pitt, Thomas, Bestman, Stoneham & Daube, 2016).

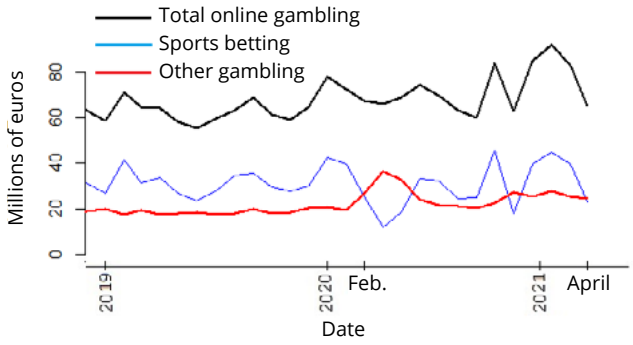
During 2019, the amount invested in advertising, promotion and sponsorship of gambling reached €369 million, an increase of 10.87% on 2018. Since 2013 there has been a rise of 215.24% in advertising investment, with an average annual growth rate of 24.59% (DGOJ, 2020). It is in this same period that online gambling has increased as a percentage of total gambling, growing at 239%, compared to the 16.5% increase in total gambling (Gómez-Yáñez & Lalanda-Fernández, 2020).

Several studies suggest that greater exposure to advertising is related to greater frequency of gambling and higher percentages of problem gambling, both in adults and in young people (Clemens, Hanewinkel & Morgenstern, 2017; Derevensky, Sklar, Gupta & Messerlian, 2010; Estévez, López-González & Jiménez-Murcia, 2018; Griffiths, 2005; Hanss, Mentzoni, Griffiths & Pallesen, 2015; Hing, Cherney, Blaszczynski, Gainsbury & Lubman, 2014). Fifteen per cent of the general population and 35% of the clinical population report being more aware of seeing gambling advertising (Hanss et al., 2015), gambling to a greater degree when seeing such advertising (Salonen, Hellamn, Latvala & Castrén, 2018) or taking greater risks in their betting after seeing advertising (Hing et al., 2018), effects which are all greater in men than in women (Felsher, Derevensky & Gupta, 2004; Lloret et al., 2017).

During 2020, the Covid-19 pandemic had a significant impact on gambling. Between the months of January and October, in-person gambling revenue fell by 54% against the same period in 2019. The arrival of the second wave then reduced in-person gambling again to 57.5% of the October 2019 level (Gómez-Yáñez & Lalanda-Fernández, 2020).

Conversely, online gambling showed an increase of 13.7% in 2020 compared to 2019 (DGOJ, 2020). Exploring the data offered by the DGOJ (2021), it can be seen that the money bet on poker rose by 36%. In total, an increase of 32% was registered in Spain during 2020 in money bet online in pure games of chance, while that placed on games of chance with a skill component (excluding sports) rose by 26%. Figure 1 shows how the fall in the total amount played in sports betting due to the suspension of events during the pandemic was compensated by the rise in the total amount gambled in other forms of betting ("Datos mercado juego online", 2021).

Figure 1
Total amount gambled in sports betting, non-sports gambling and the sum of both



Betting and Spanish youth

The ESPAD European survey, which includes 15-year-olds from 37 European countries, reported that 17% of Spanish adolescents aged 15-16 years had gambled in the previous year. Of these, 10% registered excessive gambling and 3.2% problematic gambling (ESPAD Group, 2020). Similarly, research by Carbonell and Montiel (2013) concluded that 20% of adolescents had gambled online before coming of age. Other studies agree that 28% of young people aged between 13 and 17 years declare having gambled at some time in their lives (Dirección General Ordenación del Juego, 2015; Lloret, Cabrera & Castaños, 2016).

Regarding risky and problematic gambling, epidemiological research shows that between 4%-5.6% of Spanish adolescents meet the criteria for risky gambling and 1.2% for problematic gambling (Becoña, Míguez & Vázquez, 2001; Chóliz & Lamas, 2017; González-Roz, Fernández-Hermida, Weidberg, Martínez-Loredo & Secades-Villa, 2017; Lloret et al., 2016).

Onset before the age of 18 is a good predictor of serious gambling-related problems when reaching adulthood (Lloret et al., 2017). In this sense, the proportion of non-problematic gamblers who started gambling before the age of 18 is 13.4%, while among pathological gamblers this same proportion is three time higher, rising to 44.8% (Dirección General de Ordenación del Juego, 2015). Thomas et al. (2012) pointed out that older women, young men, risky gamblers and people with a low socioeconomic

profile are groups which are especially vulnerable to the influence of the gambling industry.

Regulatory framework for betting in Spain

Law 13/2011, of May 27, governing gambling in Spain, established the regulatory framework for gambling activities at state level. Among the objectives of this law are: the prevention of addictive behaviours, the protection of the rights of minors and other especially vulnerable groups, and the protection of the general public. However, the worrying prevalence of gambling in minors, which continues to rise, indicates that regulation has not been effective in terms of these objectives. In addition, various authors have warned about how some advertising messages are aimed at younger audiences (Abarbanel, Gainsbury, King, Hing & Delfabbro, 2016; Lloret, Cabrera, Falces, García & Mira, 2020; Sklar & Derevensky, 2011). After some regional regulations or other exceptional measures, and almost a decade after the Spanish Law on Gambling, the government published Royal Decree 958/2020, of November 3, on commercial communications of gambling activities. It came into force in August 2021, and among other measures legislates and restricts advertising broadcasting schedules in audiovisual media, bans the use in gambling advertising of well-known characters and people in the public eye, prohibits sports sponsorship, such as club shirts carrying the names of gambling firms, as well as the presentation of gambling as an alternative solution to financial problems or unemployment and the use of promotions of any kind.

These measures are based on the need to minimize the impact of media pressure on the audience, especially the most vulnerable groups (e.g., adolescents, the unemployed). Various studies have shown how effectively attitudes towards betting and gambling behaviour can be changed through the principles of influence, such as economic incentives, the principle of reciprocity, the change in normative perception or the presentation of gambling as an alternative solution to financial problems (Cialdini, 2009; Deans et al., 2016; Deans et al., 2017; Gordon & Chapman, 2014; Kim, Wohl, Gupta & Derevensky, 2017; López González & Tulloch, 2015; Thomas et al., 2012).

The objective of the present study was to analyse the relationship between exposure to gambling advertising and gambling behaviour among adolescents and young adults. This is evinced through the attitude shown towards advertising and the frequency and/or intensity of gambling behaviour. In addition, the analysis will focus on differences between groups that may be more vulnerable, such as those beginning to gamble and minors. In addition, some of the measures of the new Spanish gambling advertising regulations will be related to our study variables and the literature cited.

Our hypotheses are as follows:

- *H1:* The attitude towards advertising, the impact and media pressure of advertising will be positively correlated with gambling behaviours, using frequency, intensity, maximum expenditure and intention as representative variables of this behaviour.
- *H2:* Individuals who have gambled at some point will score significantly higher on average than those who have not previously gambled in the variables advertising impact (H2.1), media pressure (H2.2) and attitude towards advertising (H2.3).
- *H3:* Minors will score significantly higher on average than older adults in the variables advertising impact (H3.1), media pressure (H3.2) and attitude towards advertising (H3.3).

Method

Participants

A total of 2,181 adolescents and young adults (46.6% men) aged between 15 and 25 years (M= 17.18, SD= 1.7) participated. Of these, 1,726 were secondary school students from state-run school in 13 municipalities located in 9 counties of the province of Alicante. The remaining 343 were students from different degree courses at the Miguel Hernández University, aged between 18 and 25 years. Another 87 were excluded for incorrectly completing some questionnaire items considered essential. The university sample comprised 168 women (49%), randomly selected from among the female students, and 175 men (51%). Mean age was 19.76 years, SD 2.8. The age distribution was 18 (26.83%), 19 (20.93%), 20 (17.70%), 21 (10.91%), 22 (7.08%), 23 (3.54 %), 24 (3.23%), 25 (1.46%), from 26 to 30 (1.83%) and did not answer (6.49%). Students came from the following degree courses: Physical Activity and Sports Sciences (36.44%), Psychology (24.78%), Business Administration and Management (11.07%), Physiotherapy (10.49%), Audiovisual Communication and Journalism (7.87%), Podiatry (5.83%) and Occupational Therapy (3.49%). Field work was carried out during the months of October 2019, and February and March 2020.

Variables and Instruments

Seven variables were measured: gambling frequency, gambling intensity, maximum spending (measured in Euros), gambling intention, media pressure, attitude towards advertising, impact of gambling advertising.

Gambling frequency. 8-item questionnaire adapted from the European ESPAD survey (Arpa et al., 2016) recording the number of times gambling took place in the last 30 days. It includes eight gambling modes: online sports betting, sports betting in lounges and/or bars, slot machines in lounges and/or bars, online poker, poker with friends in person, online casino games, roulette lounges and other bets.

Gambling Intensity: 8-item questionnaire adapted from the European ESPAD survey (Arpa et al., 2016) recording the money spent in the last 30 days in the 8 gambling modalities mentioned in the previous instrument.

Maximum spending: The South Oaks Gambling Screen (SOGS) item was used: "What is the largest amount you have gambled in the last 12 months?" (Winters, Stinchfield & Fulkerson, 1993).

Gambling intention: Questionnaire composed of the items: "Do you intend to play gambling games?" and "Are you planning to bet online soon?"; rated using a Likert scale, 1 = "Absolutely not" and 7 = "Absolutely yes". Thus, scores 1, 2 and 3 indicate no gambling intention, score 4 a neutral intention, while scores 5, 6 and 7 indicate a positive gambling intention.

Media pressure: Measured with the questionnaire used in Lloret et al. (2017) comprising 12 items that ask about the perception of exposure to advertising in three dimensions: sports betting (dimension 1), online casinos and poker (dimension 2) on television, internet, radio, magazines, outdoor advertising and the presence of gambling halls on public streets. Participants are also asked about the frequency with which they have seen gambling games being advertised by a famous person, or casinos or gambling in movies (dimension 3).

Attitude towards advertising: Degree of acceptance of advertising messages. This is assessed with the Attitudes to Gambling Advertising Scale (EAPA, Lloret et al., 2017), a self-applied questionnaire of 13 items with Likert-type responses ranging from 1 = "Strongly disagree" to 5 = "Strongly agree". It assesses three factors of the perception of gambling advertising, creating three subscales: advertisement recall (3 items), critical opinion about the effects of advertising (6 items) and affective evaluation (4 items). Higher scores indicate a more positive attitude towards gambling advertising. Internal consistency (Cronbach's α) was .719.

Impact of gambling advertising: Impact of Gambling Advertising Scale IGAS (Gervilla-García, Cabrera-Perona, & Lloret-Irles, 2021; Hanss et al., 2015). This self-applied scale has 9 items with 4-point Likert-type responses ranging from 1 = "Strongly disagree" to 4 = "Strongly agree" and assesses three factors: involvement, awareness and knowledge about betting options. Examples of items in each factor are: "Gambling advertisements increase my interest in gambling" (involvement), "Gambling advertising does NOT influence my decision to gamble" (awareness) and "Advertising has increased my knowledge of available gambling options" (knowledge). A higher score indicates a greater impact of gambling advertising. Internal consistency was 0.78.

Procedure

An expert entered each class involved to administer the paper questionnaire to all students present. Participation was voluntary and appropriate consent was requested from parents/guardians in the case of minors and from the school management. Anonymity was guaranteed. Completion time ranged from 25 to 35 minutes. Given the majority of women in the university population, a random subsample was selected in order to avoid gender bias in the analysis of the total sample. The study was authorized by the Responsible Research Office of the UMH (COIR TFM.MPG.DLI.SPG.201217).

Data analysis

A descriptive analysis of the data (means and standard deviations for age, percentage of men and women, etc.) was carried out. The Pearson correlation was used to study the relationships between advertising and gambling behaviour variables. To find significant differences between mean scores of different groups, a hypothesis test was used to compare means (Student's t) together with a measure of effect size (Cohen's d). When it was not possible to use a test such as Student's t because the necessary hypotheses were not fulfilled, the Mann-Whitney U-test, which does not assume that the groups follow any specific distribution, was used. When using the U test, the correlation coefficient $r = w\frac{z}{\sqrt{n}}$ chosen to estimate the effect size.

The level of statistical significance for correlations and hypothesis testing was set at $\alpha = 0.05$. Data analysis was performed with the IBM-SPSS 26.0 and R Studio programs.

Results

In the last year, 62% of the total sample bet an average of €16.91 (SD = 32.58), with men betting €20.89 on average (SD = 37.13) compared to €6.26 for women (SD = 7.48). Minors bet €15.56 on average (SD = 23.3) compared to €19.06 for young adults (SD = 46.7).

The variables advertising impact, media pressure and attitude towards advertising were positively and significantly related to gambling behaviour. In addition, this correlation occurred with greater magnitude in men (table 1).

We found, on average, a significantly greater impact of advertising and media pressure among those participants who had previously gambled at some point compared to those who had not, with small effect sizes close to moderate. Tables 2 and 3 show the results of the Student's t-tests[1] performed.

1 In view of the histogram, we assume the variables Advertising Impact (AI) and Media Pressure to be normal and, applying the respective Levene tests, do not reject the null hypothesis ($p = 0.07$ and $p = 0.24$ respectively) so that similar variances are assumed.

Table 1
Correlation of impact, media pressure and attitude towards advertising with gambling behaviours

Pearson correlation	Frequency	Intensity	Maximum expenditure	Intention
Advertising Impact				
Total sample	.147**	.129**	.212**	.253**
Men / Women	.161**/.131**	.170**/.025	.228**/.151**	.284**/.185**
Media Pressure				
Total sample	.099**	.104**	.154**	.146**
Men / Women	.111**/.045	.131**/.023	.186**/.056	.152**/.097**
Attitude towards Advertising				
Total sample	.251**	.242**	.291**	.393**
Men / Women	.272**/.107**	.309**/.07	.295**/.89**	.412**/.230**

Note. **correlation significant at the 0.01 level (bilateral).

Table 2
Comparison of means in Advertising Impact (AI)

Groups	Means AI	t	df	p	d
Gamblers					
Had gambled (660)	19.89 (SD =4.764)	9.780	2168	3.9E-22	0.46*
Had not gambled (1510)	17.68 (SD =4.893)				

Note. DT. SD: standard deviation; t: Student's t test; df: degrees of freedom; d: Cohen's d effect size *small (0.2-0.5).

Table 3
Comparison of means in media pressure (MP)

Groups	Means MP	t	df	P	d
Gamblers					
Had gambled (659)	30.13 (SD=7.624)	-7.709	2177	1.9E-14	0.36*
Had not gambled (1520)	27.48 (SD=7.284)				

Note. DT. standard deviation; t: Student's t test; df: degrees of freedom; d: Cohen's d effect size *small (0.2-0.5).

Table 4
Comparison of means in Attitudes towards Advertising (AA)

Groups	Means AA	Mann Whitney U	p	r
Gamblers				
Had gambled (660)	32.73 (DT=6.03)	340434.5	<0.001	.25*
Had not gambled (1514)	28.99 (DT=6.73)			

Note. SD: standard deviation; r: correlation coefficient with effect size *small (0.1-0.3).

Table 5
Comparison of means in Advertising Impact (AI).

Groups	Means AI	Mann Whitney U	p	r
Age				
Minors (1580)	18.12 (SD=4.77)	477124	<0.01	.06
Adults (563)	18.83 (SD=5.31)			

Note. DT. SD: standard deviation; r: correlation coefficient with effect size *small (0.1-0.3).

Tabla 6
Comparison of means in media pressure (MP) by age

Groups	Means MP	Mann Whitney U	p	r
Age				
Minors (1589)	27.25 (SD=7.2)	573817.5	<0.001	.22
Adults (563)	31.01 (SD=7.63)			

Note. DT. standard deviation; r: correlation coefficient with effect size *small (0.1-0.3).

Table 7
Comparison of means in total Attitudes towards Advertising (AA) and the AA beliefs subscale

Groups	Means	t	df	p	d
Age	**Total AA**				
Minors (1584)	30.78 (SD=6.352)	8.084	2145	1.03E-15	0.39*
Adults (563)	28.23 (SD=6.657)				
Age	**AA Beliefs**				
Minors (1584)	11.66 (SD=3.50)	10.35	2145	1.56E-24	0.5**
Adults (563)	9.87 (SD=3.55)				

Note. SD: standard deviation; t: Student's t test; df: degrees of freedom; d: Cohen's d effect size *small (0.2-0.5) ** moderate (0.5-0.8).

In addition, we also found a significantly higher mean score in the variable attitude towards advertising among those participants who had previously gambled compared to those who had not, with a small effect size close to moderate measured with the Pearson correlation coefficient in people who had previously gambled against those who had not (table 4).

Advertising impact was not found to be greater among minors; if anything, there were significant differences in the reverse direction, but with negligible effect size (table 5). The same applied to the media pressure variable, where a significantly higher mean score was found in adults, but this time with a small effect size close to moderate (table 6). Finally, a significantly more favourable attitude towards advertising was found in minors compared to adults (table 7). In addition, an analysis of the subscales of this variable of attitude towards advertising revealed a more favourable attitude in the beliefs subscale, with a moderate effect size (table 7).

Discussion

This study analysed the relationship between exposure to gambling advertising and gambling behaviour in a sample of 2,181 adolescents and young adults.

The results show that the variables advertising impact, media pressure and attitude towards advertising were significantly linked to gambling behaviour and, furthermore, that this correlation was greater in men. These data are consistent with those provided by Hanss et al. (2015), who reported greater conscious advertising impact on men. Of the three advertising variables analyzed, it is attitude towards advertising that had a higher correlation with gambling behaviours.

Regarding the influence of advertising on gambling behaviour, Bouguettaya et al. (2020), in a recent meta-analysis, pointed out the lack of longitudinal and experimental studies relating gambling advertising to behaviour. This is mainly the result of methodological difficulties in analyzing this phenomenon experimentally. One way of looking for evidence in favour of causality between advertising and gambling behaviour is provided by the possibility of carrying out quasi-experimental designs when a change in government regulation occurs, as is the case in Spain. Thus, with the data that we will collect in the coming months, after the new regulation comes into force and with an expected return to normality, we will be able to carry out a new study to analyse this circumstance.

In any case, the literature points to an influence of gambling advertising on attitudes through its normalization of gambling and the association with positive status (Deans et al., 2017).

We found studies in Europe and Australia that show how the gambling industry has used different areas of social entertainment beyond sports (media, shows, etc.) to normalize sports betting by giving it positive connotations associated with the rituals and characteristics that surround sports (Deans et al., 2016; López-González et al., 2018; Thomas et al., 2012). López-González and Tulloch (2015) even outline a scenario where such levels of influence may have been reached that it is sport itself that is adapting to the gambling industry.

The interest groups that the present study focussed on are those who had previously gambled as opposed to those who had not, and minors as opposed to young adults.

Regarding the first group, the results show the existence of a significantly higher mean score in the variables of advertising impact, media pressure and attitude towards advertising among those who had previously gambled compared to those who had not. The effect sizes of these differences, although small, are close to the moderate range limit. It is true that the group of people who have already gambled can include both people who have gambled only once and problem gamblers, and can form a very heterogeneous group; however, we decided on this cut-off due to the interest generated by the difference between people who have already tried gambling, even if this was merely a simple first contact, versus those who have never had the experience. In this way, we can analyze the potential implications of regulatory measures intended to make it more difficult for people to start gambling. It is expected that these measures act on the ability to attract new customers, such as the prohibition of introductory promotions.

Regarding the second group of interest, we expected to find a difference in the influence of betting advertising between minors and adults; this would be in line with studies such as those by Alhabash et al. (2020) in the case of alcohol, which found that the use in advertising campaigns of models who appeared to be under 25 years (the minimum age agreed by self-regulation) significantly increased the intention among minors to drink. Similarly, Chou, Rashad and Grossman (2008) found a relationship between fast food advertisements and childhood obesity in the United States, and there are many other examples where the influence of advertising on minors has been demonstrated (Borzekowski & Robinson, 2001; Emond et al., 2019; Pine & Nash, 2002).

Our results show that minors felt less advertising impact and media pressure than the older participants, although they scored significantly higher in the attitude towards advertising variable, according to our results. Exploring this significant difference in the attitude to advertising variable, we found that the effect size in the belief subscale was moderate ($d = 0.5$), pointing to a stronger attitude in the belief subscale which measures a critical view towards deception and manipulation. It is surprising to find that it was only the attitude towards advertising that scored

significantly higher in minors, while the opposite occurred in the other two variables. An analysis of the instrument contents may shed light on this: regarding media pressure, three groups of items refer to magazines, radio and television, while a single group refers to the Internet. Thus, it is reasonable to assume that minors do not consume the same media as adults, and the scores would therefore differ. In the same way, the questionnaire asked about movies and not about video games, and some celebrities who promote gambling are not as popular among minors as others. In conclusion, the media pressure scale is not suitable for making comparisons between both groups. Regarding advertising impact, the item scores all reflect a conscious influence of advertising on behaviours and cognitions, while the variable attitude towards advertising asks for affective evaluations, and questions about beliefs are asked in the third person. The difference in maturity between minors and older participants means that the impact variable is therefore not suitable for comparing these groups either.

Two important limitations of our comparisons of means should be mentioned: on the one hand, regarding the groups of young people who had previously gambled versus those who had not, we lack data on other variables that have been shown to be related to gambling, such as personality, socioeconomic status, or family relationships, which can all be variables that mediate the initiation to gambling (Dowling et al., 2017; Thomas et al., 2012). Therefore, it would be important to consider some of these variables in future samples that allow us to explore this effect. Along similar lines, the group of older adults is made up of university students and is compared with younger secondary school students; here, socioeconomic and personality variables may also influence the results. Furthermore, at the age of 16, when compulsory education ends, a part of the sample is lost that would be necessary to study given that, taking into account socioeconomic variables, they probably present a greater incidence of gambling. For this reason, it is proposed to extend the research to the general adult population to make comparisons.

As for gender, the low correlation of advertising variables with gambling intensity in the case of women is noteworthy. This, together with our data on the percentage of women who gambled online compared to in person, leads us to wonder whether some women go to gambling places as an act of socialization, and whether this socialization occurs in mixed groups or is led by their partners. Although gambling among young women today is not a concern, there are other types of games, such as bingo, where women appear to be more vulnerable (Ibáñez, Blanco, Moreryra & Sáiz-Ruiz, 2003). In addition, in the case of other addictive behaviours with a large industry behind them, such as tobacco, there are examples of how the industry has known how to find the right time and conditions to target women in its campaigns (which were originally more associated with men) (Mackay & Amos, 2003). Therefore, the problem of gambling should also be investigated from a gender perspective to warn of any changes in this regard.

Similarly, the limits marking what constitutes a gambling game are increasingly blurred: in recent years, financial companies or brokers offering a large number of trading services (including commission-free) with very aggressive online advertising campaigns have become popular among non-professional investors (Fink, 2021). Among these services, many are created in the image of betting games; for example, binary options would be equivalent to betting that a share price will rise, fall or reach a certain threshold. Numerous authors equate these financial practices with gambling (Dorn, Dorn & Sengmueller, 2015; Gao & Lin, 2015; Núñez, 2017).

In addition, it is no longer audiovisual channels that have the greatest influence on younger generations, but digital ones. The video game industry uses monetization strategies such as loot boxes where the same psychological variables operate as in gambling (Drummond & Sauer, 2018; Zendle, Meyer & Over, 2019). Video games and gambling are currently expanding into new decentralized applications around the blockchain ecosystem and opening a new digital divide given the complexity of their foundations. Beyond some news items in the general media, there is widespread ignorance about the rise of cryptocurrencies and decentralized finance, where more than half of the frequent gamblers have invested (Mills & Nower, 2019). In short, beyond regulating advertising, which we see as a positive move, it is urgently necessary to adopt strong measures focused on improving education, prevention and intervention.

Conflict of interests

The authors declare no conflicts of interest.

References

Abarbanel, B., Gainsbury, S. M., King, D., Hing, N. & Delfabbro, P. H. (2016). Gambling games on social platforms: How do advertisements for social casino games target young adults? *Policy & Internet*, 9, 184–209. doi:10.1002/poi3.135.

Alhabash, S., Mundel, J., Deng, T., McAlister, A., Quilliam, E. T., Richards, J. I. & Lynch, K. (2020). Social media alcohol advertising among underage minors: Effects of models' age. *International Journal of Advertising*, 1-30. doi:10.1080/02650487.2020.1852807.

Arpa, S., Kraus, L., Leifman, H., Molinaro, S., Monshouwer, K., Trapencieris, M. & Vicente, J. (2016). *ESPAD Report 2015 Results from the European School Survey Project on Alcohol and Other Drugs*. European Monitoring Centre on Drugs and Drug Addiction. Lisbon. doi:10.2810/022073.

Becoña, E., Míguez, M. C. & Vázquez, F. L. (2001). El juego problema en los niños de Galicia. Madrid: Sociedad Española de Psicopatología Clínica, Legal y Forense.

Borzekowski, D. L. & Robinson, T. N. (2001). The 30-second effect: An experiment revealing the impact of television commercials on food preferences of preschoolers. *Journal of the American Dietetic Association, 101,* 42-46. doi:10.1016/S0002-8223(01)00012-8.

Bouguettaya, A., Lynott, D., Carter, A., Zerhouni, O., Meyer, S., Ladegaard, I.,… O'Brien, K. S. (2020). The relationship between gambling advertising and gambling attitudes, intentions and behaviours: A critical and meta-analytic review. *Current Opinion in Behavioral Sciences*, *31*, 89-101. doi:10.1016/j.cobeha.2020.02.010.

Carbonell, E. J. & Montiel, I. (2013). *El juego de azar online en los nativos digitales*. Valencia: Tirant Humanidades.

Chóliz, M. & Lamas, J. (2017). ¡Hagan juego, menores! Frecuencia de juego en menores de edad y su relación con indicadores de adicción al juego. *Revista Española de Drogodependencias*, *42*, 34-47.

Chou, S. Y., Rashad, I. & Grossman, M. (2008). Fast-food restaurant advertising on television and its influence on childhood obesity. *The Journal of Law and Economics*, *51*, 599-618. doi:10.1086/590132.

Cialdini, R. B. (2009). *Influence: Science and practice* (Vol. 4). Boston, MA: Pearson education.

Clemens, F., Hanewinkel, R. & Morgenstern, M. (2017). Exposure to gambling advertisements and gambling behavior in young people. *Journal of Gambling Studies*, 33, 1-13. doi:10.1007/s10899-016-9606-x.

Datos mercado juego online (2021). Dirección General de Ordenación del Juego. https://www.ordenacionjuego.es/.

Deans, E. G., Thomas, S. L., Daube, M., Derevensky, J. & Gordon, R. (2016). Creating symbolic cultures of consumption: An analysis of the content of sports wagering advertisements in Australia. *BMC Public Health, 16,* 1-11. doi:10.1186/s12889-016-2849-8.

Deans, E. G., Thomas, S. L., Daube, M. & Derevensky, J. (2017). The role of peer influences on the normalisation of sports wagering: A qualitative study of Australian men. *Addiction Research & Theory*, *25*, 103-113. doi:10.1080/16066359.2016.1205042.

Derevensky, J., Sklar, A., Gupta, R. & Messerlian, C. (2010). An empirical study examining the impact of gambling advertisements on adolescent gambling attitudes and behaviors. *International Journal of Mental Health and Addiction, 8,* 21-34. doi:10.1007/s11469-009-9211-7.

Dirección General de Ordenación del Juego (2015). Memoria anual 2014. Ministerio de Hacienda y Función Pública. España.

Dirección General de Ordenación del Juego (2019). Memoria anual 2018. Ministerio de Hacienda y Función Pública. España.

Dirección General de Ordenación del Juego (2020). Memoria anual 2019. Ministerio de Hacienda y Función Pública. España.

Dorn, A. J., Dorn, D. & Sengmueller, P. (2015). Trading as gambling. *Management Science*, *61*, 2376-2393. doi:10.1287/mnsc.2014.1979.

Dowling, N. A., Merkouris, S. S., Greenwood, C. J., Oldenhof, E., Toumbourou, J. W. & Youssef, G. J. (2017). Early risk and protective factors for problem gambling: A systematic review and meta-analysis of longitudinal studies. *Clinical psychology review, 51,* 109-124. doi:10.1016/j.cpr.2016.10.008.

Drummond, A. & Sauer, J. (2018). Video game loot boxes are psychologically akin to gambling. *Nature human behaviour*, *2,* 530-532. doi:10.1038/s41562-018-0360-1.

Emond, J. A., Longacre, M. R., Drake, K. M., Titus, L. J., Hendricks, K., MacKenzie, T.,… Dalton, M. A. (2019). Influence of child-targeted fast food TV advertising exposure on fast food intake: A longitudinal study of preschool-age children. *Appetite*, *140*, 134-141. doi:10.1016/j.appet.2019.05.012.

ESPAD group (2020). Results from the European school survey project on alcohol and other drugs. European Monitoring Centre for Drugs and Drug Addiction.

Estévez, A., López-González, H. & Jiménez-Murcia, S. (2018). La influencia de la publicidad comercial en la conducta de riesgo en las apuestas deportivas: Recomendaciones para reguladores, operadores, instituciones y medios. Informe técnico. Madrid: ONCE. doi:10.13140/RG.2.2.23040.48645.

Felsher, J. R., Derevensky, J. L. & Gupta, R. (2004). Lottery playing amongst youth: Implications for prevention and social policy. *Journal of Gambling Studies*, *20*, 127-153. doi:10.1023/B:JOGS.0000022306.72513.7c.

Fink, C. (2021). Why millennials gravitate to new brands in online investing. *Journal of Brand Strategy*, *9*, 401-407.

Gao, X. & Lin, T. C. (2015). Do individual investors treat trading as a fun and exciting gambling activity? Evidence from repeated natural experiments. *The Review of Financial Studies*, *28*, 2128-2166. doi:10.1093/rfs/hhu075.

Gervilla-García, E., Cabrera-Perona, V. & Lloret-Irles, D. (2021). Adaptación española de la Escala de Impacto de la Publicidad de Apuestas en adolescentes. *Atención Primaria* (in press).

Gómez-Yánez, J. A. & Lalanda-Fernández, C. (2020). Anuario del Juego en España. Instituto de Política y Gobernanza de la Universidad Rey Juan Carlos y Grupo Codere. Madrid.

González-Roz, A., Fernández-Hermida, J. R., Weidberg, S., Martínez-Loredo, V. & Secades-Villa, R. (2017). Prevalence of problem gambling among adolescents: A comparison across modes of access, gambling activities, and levels of severity. *Journal of gambling studies*, *33*, 371-382. doi:10.1007/s10899-016-9652-4.

Gordon, R. & Chapman, M. (2014). Brand community and sports betting in Australia.

Griffiths, M. (2005). Does gambling advertising contribute to problem gambling? *International Journal of Mental Health & Addiction*, 3, 15-25. doi:10.11575/PRISM/9487.

Hanss, D., Mentzoni, R. A., Griffiths, M. D. & Pallesen, S. (2015). The impact of gambling advertising: Problem gamblers report stronger impacts on involvement, knowledge, and awareness than recreational gamblers. *Psychology of addictive behaviors*, *29*, 483. doi:10.1037/adb0000062.

Hing, N., Cherney, L., Blaszczynski, A., Gainsbury, S. M. & Lubman, D. I. (2014). Do advertising and promotions for online gambling increase gambling consumption? An exploratory study. *International Gambling Studies, 14,* 394-409. doi:10.1080/14459795.2014.903989.

Hing, N., Russell, A., Rockloff, M., Browne, M., Langham, E., Li, E.,… Thorne, H. (2018). Effects of wagering marketing on vulnerable adults. Melbourne, Australia: Victorian Responsible Gambling Foundation.

Ibáñez, A., Blanco, C., Moreryra, P. & Sáiz-Ruiz, J. (2003). Gender differences in pathological gambling. *The Journal of clinical psychiatry, 64,* 295-301. doi:10.4088/jcp.v64n0311.

King, D., Delfabbro, P. & Griffiths, M. (2010). The convergence of gambling and digital media: Implications for gambling in young people. *Journal Gambling Studies*, *26,* 175–87. doi:10.1007/s10899-009-9153-9.

Kim, H. S., Wohl, M. J., Gupta, R. & Derevensky, J. L. (2017). Why do young adults gamble online? A qualitative study of motivations to transition from social casino games to online gambling. *Asian Journal of Gambling Issues and Public Health*, 7, 6. doi:10.1186/s40405-017-0025-4.

Lloret, D., Cabrera, V. & Castaños, A. (2016). Estudio juego de apuestas en adolescentes de la provincia de Alicante. Diputación de Alicante. http://www.pnsd.msssi.gob.es/profesionales/publicaciones/catalogo/bibliotecaDigital/public aciones/BDMenoresyDrogas.htm.

Lloret, D., Cabrera, V., Castaños, A., Segura, J. V., Antón, M. A. & Caselles, P. (2017). El juego de apuestas en adolescentes de la provincia de Alicante II. Estudio longitudinal de los hábitos de juegos de apuestas y los predictores psicosociales. Informe técnico. Diputación de Alicante.

Lloret, D., Cabrera, V., Falces, C., García, H. & Mira, S.(2020). ¡¡Jóvenes a jugar!! Análisis del impacto de la publicidad en el juego de apuestas en adolescentes. Madrid: Centro Reina Sofía sobre Adolescencia y Juventud, Fad. doi:10.5281/zenodo.3629535.

López-González, H. & Tulloch, C. D. (2015). Enhancing media sport consumption: Online gambling in European football. *Media International Australia, 155,* 130-139. doi:10.1177%2F1329878X1515500115.

López-González, H., Guerrero-Solé, F. & Griffiths, M. D. (2018). A content analysis of how 'normal'sports betting behaviour is represented in gambling advertising. *Addiction Research & Theory*, *26*, 238-247. doi:10.1080/16066359.2017.1353082.

Mackay, J. & Amos, A. (2003). Women and tobacco. *Respirology*, *8*, 123-130.

Mills, D. J. & Nower, L. (2019). Preliminary findings on cryptocurrency trading among regular gamblers: A new risk for problem gambling? *Addictive behaviors*, *92*, 136-140. doi:10.1016/j.addbeh.2019.01.005.

Núñez, J. (2017). A clinical economy of speculation: Financial trading and gambling disorder in Spain. *Cultural Anthropology*, *32*, 269-293. doi:10.14506/ca32.2.08.

Parke, A., Harris, A., Parke, J., Rigbye, J. & Blaszczynski, A. (2015). Responsible marketing and advertising in gambling: A critical review. *The Journal of Gambling Business and Economics, 8,* 21-35.

Pine, K. J. & Nash, A. (2002). Dear Santa: The effects of television advertising on young children. *International Journal of Behavioral Development, 26,* 529-539. doi:10.1080%2F01650250143000481.

Pitt, H., Thomas, S. L, Bestman, A., Stoneham, M. & Daube, M. (2016). "It's just everywhere!" Children and parents discuss the marketing of sports wagering in Australia. *Aust N Z J Public Health*, *40,* 480–486. doi:10.1111/1753-6405.12564.

Salonen, A. H., Hellman, M., Latvala, T. & Castrén, S. (2018). Gambling participation, gambling habits, gambling-related harm, and opinions on gambling advertising in finland in 2016. *Nordic Studies on Alcohol and Drugs*, *35,* 215-234. doi:10.1177%2F1455072518765875.

Sklar, A. & Derevensky, J. L. (2011). Way to play: Analyzing gambling ads for their appeal to underage youth. *Canadian Journal of Communication*, 35.

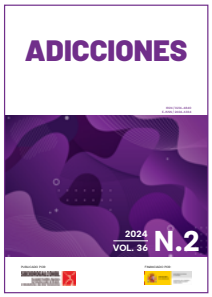
Thomas, S. L., Lewis, S., McLeod, C. & Haycock, J. (2012). 'They are working every angle'. A qualitative study of Australian adults' attitudes towards, and interactions with, gambling industry marketing strategies. *International Gambling Studies*, *12*, 111-127. doi:10.1080/14459795.2011.639381.

Winters, K. C., Stinchfield, R. D. & Fulkerson, J. (1993). Toward the development of an adolescent gambling problem severity scale. *Journal of gambling studies*, 9, 63-84. doi:10.1007/BF01019925.

Zendle, D., Meyer, R. & Over, H. (2019). Adolescents and loot boxes: Links with problem gambling and motivations for purchase. *Royal Society Open Science, 6,* 190049. doi:10.1098/rsos.190049.

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

ADICCIONES
2024 ■ VOL. 36 ■ N. 2 ■ PAGES 177–188
www.adicciones.es



ORIGINAL

Problematic use of WhatsApp and adolescents: What educational role do parents play?

Uso problemático de WhatsApp entre adolescentes: ¿Qué papel educativo juegan los padres y las madres?

Marc Grau-Grau*, María Gloria Gallego-Jiménez**, Luis Manuel Rodríguez Otero***, ****.

* Facultad de Ciencias de la Educación, Universidad Internacional de Catalunya.
** Facultad de Humanidades y Ciencias de la Comunicación, Universidad CEU San Pablo.
*** Facultad de Educación, Universidad Internacional de La Rioja.
**** Facultad de Trabajo Social, Universidad Autónoma de Sinaloa.

Abstract

The goal of this study is to understand the relationship between the problematic use of WhatsApp among young adolescents and parental mediation. The rise of mobile phone use among young people is a cause for concern, especially among parents themselves. The literature suggests that parents have a certain amount of room for maneuver through different parental strategies (parental mediation) to maximize the benefits of technology and reduce its possible risks, although this has not been sufficiently analyzed in the case of problematic use of the mobile phone and its applications. This study therefore examined three different parental mediation strategies (restrictive, modeling and stimulation) and their possible impact on the problematic use of WhatsApp. The sample comprised 1,144 13- and 14-year-old students during three academic years (2015-2018) in 17 schools in 7 Spanish provinces. One of the novelties of the study was the use of adolescent voices to understand the parental mediation of their parents. The results showed a direct relationship between the level of restrictive mediation and a problematic use of WhatsApp. In addition, the number of mobile phones that students have enjoyed, as well as whether parents use their mobile phone during dinner, also has a positive relationship with the problematic use of WhatsApp. These results are useful for understanding a responsible use of the mobile phone, as well as to guide parents about the problematic use of WhatsApp among adolescents.

Keywords: problematic use, WhatsApp, mobile phone, parental mediation, adolescence

Resumen

El objetivo del presente estudio es comprender la relación entre el uso problemático del WhatsApp entre jóvenes adolescentes y la mediación parental. El auge del uso del teléfono móvil entre los jóvenes es motivo de preocupación, especialmente entre los propios padres y madres. La literatura sugiere que los progenitores disponen de cierto margen de maniobra a partir de distintas estrategias parentales (mediación parental) para maximizar los beneficios de la tecnología, y reducir sus posibles riesgos, sin ser suficientemente analizadas en el caso del uso problemático del móvil y sus aplicaciones. Por este motivo, este estudio examina tres distintas estrategias de mediación parental (restrictiva, modelado y estimulación) y su posible impacto en el uso problemático del WhatsApp. Para ello, se empleó una muestra de 1.144 estudiantes de 13 y 14 años durante tres cursos académicos (2015-2018) en 17 colegios de 7 provincias españolas. Una de las novedades del estudio es el uso de las voces de los adolescentes para comprender la mediación parental de sus padres. Los resultados muestran una relación entre el nivel de mediación restrictiva y un uso problemático de WhatsApp. Además, el número de móviles que han gozado los estudiantes, así como si los padres cenan con el móvil durante la cena también tiene una relación positiva con el uso problemático de WhatsApp. Estos resultados son útiles para entender un uso responsable del teléfono móvil, así como para orientar a padres sobre el uso problemático de WhatsApp entre adolescentes.

Palabras clave: uso problemático, WhatsApp, teléfono móvil, mediación parental, adolescencia

■ *Received: December 2021; Accepted: July 2022.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Marc Grau-Grau. Facultad de Ciencias de la Educación, Universidad Internacional de Catalunya. Carrer de Josep Trueta S/N, 08195 Sant Cugat del Vallès, Barcelona, España. Email: mgraug@uic.es

The irruption of technology is claimed by 93.7% of Spaniards to have affected their family routines (Centro de Investigaciones Sociológicas, 2015), resulting in poorer communication between parents and children (67.9%) and between partners (49.4%), and increasing family conflict (51.5%). Five decades after Martin Cooper's first call from a modern mobile phone, most people in post-industrial society have a mobile phone of their own. Teenagers are no exception.

According to recent data, 69.5% of Spanish adolescents have a mobile phone, rising to 95.7% at 15 years of age (Instituto Nacional de Estadística, 2020), with the rite of passage taking place between the age of 12 and 13 years. Among adolescents, 40% of boys and almost 30% of girls say they touch their mobile phone between 50 and 100 times a day, which implies an active contact every 15 or 20 minutes (Masip & Balagué, 2015).

Such intensive use of the mobile phone invites reflection on possible problematic use (Chóliz, Villanueva & Chóliz, 2009; Pedrero Pérez, Morales Alonso & Ruíz Sánchez de León, 2021; Pedrero Pérez, Rodríguez Monje & Ruíz Sánchez De León, 2012; Ruiz-Ruano García, López-Salmerón & López Puga, 2020; Sánchez-Romero & Álvarez-González, 2018). Although some studies use the term addiction, the American Psychiatric Association (APA) does not consider this suitable for referring to dependent use of mobile phones. According to different authors, the most appropriate term to refer to this dependent use seems to be *problematic use* (Panova & Carbonell, 2018). Thus, different studies present levels of problematic mobile phones use among Spanish adolescents ranging from 2.8% to 26% (Besolí, Palomas & Chamarro, 2018; Carbonell, Fúster, Chamarro & Oberst, 2012; Golpe Ferreiro, Gómez Salgado, Kim Harris, Braña Tobío & Rial Boubeta, 2017; López-Fernández, 2017).

It is interesting to break daily mobile phone usage down in order to better understand its possible implications. Of the total daily use (165 minutes on average according to some studies), a fifth is dedicated to WhatsApp (Montag et al., 2015), an instant messaging application that 90.6% of young people confirm to have (Golpe Ferreiro et al., 2017), and 83.3% report using it daily (García-Jiménez, López-de-Ayala López & Montes-Vozmediano, 2020). However, and although its use is daily and widespread, WhatsApp has been paid very little academic attention. This study therefore aims to understand the problematic use of WhatsApp among adolescents, and its relationship with the educational role of their parents, examining the voice of 1,144 13- to 14-year-old Spanish adolescents themselves. Given this situation, and knowing that most Internet use takes place in the home, and more precisely in the rooms of adolescents, in *bedroom culture*, (Livingstone, Haddon, Görzig & Ólafsson, 2011), reflection on the educational role of parents is urgently needed.

A possible approach to encouraging good mobile phone and WhatsApp use among adolescents is parental mediation. By parental mediation, we mean the strategies that parents can use to reduce and minimize the risks of technology for their children and, in turn, enhance the benefits (Berríos, Buxarrais & Garcés, 2015; Chng, Li, Liau & Khoo, 2015; López de Ayala & Ponte, 2016).

Each great technological irruption in the home has been accompanied by new strategies of adults to educate, limit, or restrict access and content available to minors. First it was television, then video games and computers, and now it is smartphones. There were basically three parental mediation strategies for television: *active* (explaining and discussing the benefits of responsible consumption/use); *restrictive* (limiting hours and prohibiting certain content); and *shared viewing* (watching TV together) (Nathanson, 1999, 2001). For video games, mediation strategies were very similar to those for television: active, restrictive, and shared play (Shin & Huh, 2011).

With the appearance of mobile phones, however, the complexity and difficulty perceived by parents in managing the use of these devices by their sons and daughters has grown. This increase in complexity is due to the nature of the device itself, since its complete portability and individual use, alongside other obstacles such as lack of time or lack of knowledge about the multiplicity of uses these mobile devices offer, make it difficult to control and manage (Besolí et al., 2018; Symons, Ponnet, Walrave & Heirman, 2017).

Here, the academic literature presents a series of parental strategies that may be classified as *active mediation*, parental efforts to talk and discuss the risks; *restrictive mediation*, parental efforts to limit the time and availability of use; *shared mediation*, parental efforts to observe active use of devices; and *technological mediation*, parental efforts to limit and control the use of technology and access to devices (Livingstone & Helsper, 2008). In Spain, the most used parenting strategies are active and restrictive, with 90% of parents using one of the two strategies, and technological mediation being the least used (Garmendia Larrañaga, Casado del Río & Martínez Fernández, 2015). Nevertheless, parents prefer to use active mediation above restrictive or technological mediation if possible (Martínez, Casado & Garitaonandia, 2020).

Of the four strategies, some studies suggest that the most effective is the restrictive (Kirwil, Garmendia, Garitaonandia & Martínez Fernández, 2009). In a study with more than 40,000 adolescents, 51.1% reported that their parents limited their use of the Internet, and 47.9% the use of their mobile phone (Golpe Ferreiro et al., 2017). This is the reason why our study aimed to understand the relationship between restrictive parental mediation and the problematic use of WhatsApp; and the first research

question guiding this study: To what extent is there a relationship between restrictive parental strategies and adolescents' problematic use of WhatsApp?

Other studies, however, present a more marginal role of parents (Malvini Redden & Way, 2016) in the control and management of the use of the internet and mobile devices of their children. Symons et al. (2017) called this type of parent 'watchdogs' because their role is minimal, but they step in when needed. Such parents justify their passive role by the need to offer their children some privacy and space, together with the perception that online life is part of the social life in which adolescents must be able to develop autonomously. This typology of parents resembles the *worried absent* families that emerged from the analysis by Torrecilas-Lacave et al. (Torrecillas-Lacave, Encina Morales de Vega & Vázquez-Barrio, 2017).

Along these lines, there are two indirect strategies that are often not considered part of parental mediation by many authors, but which can have a direct impact on the way children act. The first is parental modelling, one of the seven strategies emerging from a study with parents of children in primary education (Bartau-Rojas, Aierbe-Barandiaran & Oregui-González, 2018). Parental modelling is understood as instructing and teaching by example, under the assumption that adolescents will copy everything they see in their parents. We thus assume that the way parents use WhatsApp will affect how their children do so. To better investigate this, a very important moment of the day was chosen: dinner. The literature suggests that families who eat together have many positive psychological, social, or developmental outcomes. For example, although family dinners seem to be declining (Fischler, 2011), they contribute to healthier eating behaviours, as well as greater family cohesion, greater self-regulation of children, among others, and even better financial preparation for the following day (Chatterjee, Palmer & Goetz, 2012; Eisenberg, Olson, Neumark-Sztainer, Story & Bearinger, 2004; Taverns et al., 2005). For this reason, and aware of the direct impact the use of mobile phones has on parent-child relationships, we were interested in understanding the relationship between parental use of WhatsApp precisely during dinner and its problematic use by their children, giving rise to the second question guiding this research: To what extent is there a relationship between parents' use of WhatsApp at dinner and their children's problematic WhatsApp use?

The third parental measurement strategy explored in this study is stimulation. Stimulation is understood as an indirect and possibly unconscious strategy that explains how the number of smartphones 'enjoyed' (in the sense of having the privilege of using them) can lead to greater use, and consequently, to a greater probability of problematic use. Castillo and Ruiz-Olivares (2019) found a positive relationship between enjoying more than two smartphones with a problematic use of these. The availability of a number of mobile phones bought or used can be understood as an 'invitation' to use them, since parents, as mediators in the number of mobile phones used by their children, can reinforce or limit the relevance of the mobile device via the number of devices provided for their children. In fact, some studies indicate that parents, despite awareness of the harmful consequences of the mobile phone, use it as a source of punishment and reward, where punishment is associated with the limitation of the mobile phone, and reward with the purchase of new devices or more time of use (Condeza, Herrada-Hidalgo & Barros-Friz, 2019). In this study, stimulation through the number of mobiles enjoyed is considered a parental mediation strategy. The third and last question guiding the study is therefore: To what extent does the number of mobiles enjoyed by adolescents have a positive relationship with the problematic use of WhatsApp?

Finally, an interesting literature review carried out by López de Ayala and Ponte (2016) on parental mediation of online practices in Spain highlighted that 1) there has been a slight decrease in the number of investigations examining parental mediation, 2) mediation is a "minor" topic in the studies examined, 3) of the 39 studies published in Spain, 20 of them have been published in an institutional environment, and 4) the informants participating in the studies on parental mediation continue to be the parents rather than the children.

Therefore, given the need to reflect on and understand the educational role of parents in the digital age, together with considerable problematic WhatsApp use among adolescents, and insufficient literature exploring the relationship between the two, this study aimed to contribute to advancing the research on parental mediation and the problematic use of new technologies among adolescents. To understand the relationship between the problematic use of WhatsApp and its educational role, a sample of 1,144 Spanish adolescents was selected.

The novelty of the study is threefold. First, it examined the problematic use of an application that despite accounting for a fifth of daily online time is still to receive adequate academic attention: WhatsApp (Montag et al., 2015; Tresáncoras, García Oliva & Piqueras Rodríguez, 2017). Second, the study connected the problematic use of WhatsApp with three parental mediation strategies (restrictive, modelling and stimulation), the last two rarely being examined (Bartau-Rojas et al., 2018; Condeza et al., 2019). Finally, the study used the "voices" of the adolescents themselves to understand parental mediation and avoid a possible overestimation reported by the parents (Martínez et al., 2020).

Method

Participants

To explore the relationship between parental mediation and problematic WhatsApp use among adolescents, this study was based on a sample of 1,144 students aged 13 and 14 from 64 different classes in 17 secondary schools in Spain over a period of three academic years: 2015/2016, 2016/2017 and 2017/2018. The 17 schools are located between the Balearic Islands (N = 59), Barcelona (N = 565), Gerona (N = 149), Guipúzcoa (N = 23), Lérida (N = 47), Madrid (N = 149) and Tarragona (N = 152). The secondary schools deciding to participate in the study, carried out by a Foundation, had twin goals: to promote responsible use of mobile phones among their students, and to discover the state of play in their classrooms. All participating schools were state-run (concertado), and all students were in their second year of compulsory secondary education (ESO). The global sample comprised over 20,000 students, from which a final sample of 1,144 students was selected by simple random sampling with a 5% margin of error and a 99% confidence level.

Instruments

An ad hoc exploratory questionnaire was developed using an ex-post facto methodology, not generalizable, to collect information on the problematic use of mobile phones and WhatsApp. The questionnaire comprised 36 items, and was distributed in Spanish and Catalan, depending on the school. The items were developed by the Foundation promoting the project, and the data from the questionnaire related to problematic WhatsApp use were transferred to the researchers of this study for analysis. The data transferred were completely anonymized making it impossible to identify any student.

The main variable of this study was problematic WhatsApp use. To analyse it, the following question (answers: 1 = yes, 0 = no) was used: In view of your answers on this questionnaire, do you think you are addicted to WhatsApp?

To understand the restrictive mediation strategy, seven questions were used (see Table 1). Based on the responses of the participants, three levels of restrictive mediation were generated: strict (when the child answers 1 on no or one occasion), moderate (when the child answers 1 between two and three times), lax (when the child answers 1 between four and seven times). In conjunction with the young person's response to the self-reported problematic use item, these questions can help to confirm whether or not use of the instant messaging application is really problematic.

To understand the effect of the parents' own example (modelling), a single question was analysed: students were asked if their parents had the mobile next to them during dinner and checked it, with two possible answers 1 = yes, 0 = no.

Item 14 was used to understand the number of mobile phones (stimulation) that the analysed students enjoyed: How many different cell phones have you had? To facilitate the analysis, a new *dummy* variable was created with the options 1 = three or more mobiles, 0 = fewer than three mobiles.

Procedure

All school management teams were informed of the aim of the program, and permission was requested to distribute questionnaires. Once the school agreed to participate in the program, consent was requested from the parents of the students, given their status as minors. All students were informed of the anonymous and confidential nature of the study. The questionnaire was distributed to the whole class by their teachers, always during class time, in most cases taking advantage of sessions with the class teacher. The time for answering the questionnaire was 15-20 minutes.

Analysis

Questionnaire data were entered into the statistical program STATA version 12. The analysis carried out included the study of descriptive statistics for each of the selected variables (totals, frequencies, and the chi-square

Table 1
Questionnaire items for restrictive strategy

Question	Answers
1) When you wake up, is the first thing you do to look at WhatsApp?	1 = yes; 0 = no
2) What time do you send the first WhatsApp message of the day?	Possible answers 6 (a)
3) Do you carry your mobile with you everywhere, even at home?	1 = yes; 0 = no
4) At lunch and dinner, do you have your mobile next to you and do you look at it?	1 = yes; 0 = no
5) At what time do you send the last WhatsApp message of the day?	Possible answers 6 (b)
6) Do you turn off your mobile at night?	1 = no; 0 = yes
7) Do you sleep with your mobile under the pillow or on the bedside table so that it is within reach?	1 = yes; 0 = no

Note. (a) Dummy variable 1 = before 8 a.m.; 0 = after 8 a.m. (b) Dummy variable 1 = after 10 p.m.; 0 = before 10 p.m.

and Spearman's Rho tests), and the table of correlations between the variables examined. To estimate parental mediation in the problematic use of WhatsApp, logistic regressions (logit) were used with the dichotomous variables defining the variables under analysis.

Results

The aim of the study was to understand the relationship between parental mediation strategies and the problematic use of WhatsApp among 13- and 14-year-old adolescents. To this end, we analysed an initial sample of 1,547 students in their second year of secondary education in 64 classes from 17 schools for three years. As shown in Table 2, 79% of students analysed had a mobile phone, with a slight increase observed in the proportion of students with a mobile from the 2015/16 academic year (75%) to the 2017/18 academic year (82%). In relation to WhatsApp, 74% stated that they had this instant messaging application on their mobile. Once again, an increase was found in the number of students with WhatsApp, rising from 68% in 2015/16 to 78% in 2017/18. Since the purpose of this study was to understand the relationship between different parenting strategies and the problematic use of WhatsApp, the final sample was composed only of students who had WhatsApp (N = 1,144 students).

As shown in Table 2, 24.8% of the second-year students in our sample admitted to having problematic use of WhatsApp. A second question, with a similar but not identical focus, asked students to assess whether

Table 2
Totals, frequencies and chi square test of WhatsApp use and restrictive mediation

			2015/16	2016/17	2017/18	Total	Chi	p
Students with a mobile phone		n	301	382	539	1.222		
		%	74.9	78.4	81.9	79.0	7.58	0.02
		Total	402	487	658	1.547		
Students with WhatsApp		n	275	353	516	1.144		
		%	68.4	72.5	78.4	73.9	13.75	0.00
			402	487	658	1.547		
Problematic WhatsApp use	According to adolescents themselves	n	64	102	118	284		
		%	23.3	28.9	22.9	24.8	4.55	0.10
		Total	275	353	516	1.144		
	According to environment (self-report)	n	71	100	138	309		
		%	25.8	28.3	26.7	27.0	0.53	0.77
		Total	275	353	516	1.144		
Restrictive mediation	First action is checking WhatsApp	n	89	120	130	339	9.08	0.01
		%	32.4	34.0	25.2	29.6		
	First message before 8 a.m.	n	98	158	241	497	9.31	0.01
		%	35.6	44.8	46.7	43.4		
	Carrying phone at home	n	137	182	261	580	0.19	0.91
		%	49.8	51.6	50.6	50.7		
	Lunch and dinner with phone	n	41	55	65	161	1.75	0.42
		%	14.9	15.6	12.6	14.1		
	Last WhatsApp after 10 p.m.	n	165	198	285	648	1.72	0.42
		%	60.0	56.1	55.2	56.6		
	Phone not turned off at night	n	178	215	297	690	3.93	0.14
		%	64.7	60.9	57.6	60.3		
	Sleeping with phone	n	128	168	235	531	0.36	0.84
		%	46.5	47.6	45.5	46.4		
	Total	n	275	353	516	1.144	-	-
More than 3 mobiles		n	116	142	186	444		
		%	42.2	40.2	36.0	38.8	3.27	0.19
		Total	275	353	516	1.144		

people close to them told them that they were hooked on their smartphones. Here, the results show that 27% stated that people in their environment considered them to have problematic use; thus, according to the sample, self-perception was lower than the perception by their environment.

Table 2 shows the seven items making up restrictive mediation by parents, since the study assumes that parents have some room for manoeuvre in the use and management of their adolescent children's mobile phones and WhatsApp when they are at home. The results of the study reveal that 30% admitted that the first thing they did on waking up was to look at WhatsApp, and 43% sent their first message before 8 in the morning. More than half of the students (51%) stated that they always had the phone with them when they were at home, and 14% reported using the mobile during lunch and dinner. At night, rather lax parental control of WhatsApp use was observed, with more than half (57%) of adolescents sending the last WhatsApp later than 10 at night, 60% confirming that they did not turn off the phone during the night, and 46% sleeping with it, leaving it either under the pillow or on the bedside table. Table 2 also shows slight variations across the three academic years.

Using the seven variables examined in Table 2, three possible levels of restrictive mediation (strict, moderate, and lax) were created based on the children's responses, as detailed in the Methodology section. This categorization (Table 3) shows a quarter of the fathers and/or mothers (25.5%) using a strict strategy, with clear rules on when and how to use the mobile and WhatsApp, and this group is the one reporting the lowest level of problematic WhatsApp use (7.5%). At the other extreme, a third of the parents used a lax strategy, that is, very low control over the use and management of their children's mobile and WhatsApp, with this group having the highest percentage of students reporting problematic WhatsApp use (45%). In between these two strategies, 41% of participants used moderate restrictive mediation, with problematic WhatsApp use reported by an average of 20.1%.

A second parenting skill examined in the study is the example of the parents themselves (modelling). As shown in Table 3, 17% of the sample confirmed that their parents used their mobile phones during dinner, with these adolescents reporting a higher problematic use of WhatsApp (29.0%) than the children of parents who do not use the phone during the evening meal (23.9%).

Finally, the last parental skill analysed is stimulation, which refers to the number of mobiles enjoyed by adolescents between 13 and 14 years of age. As shown in Table 3, 39% have had more than three mobile phones in their life, although the results show a slight decline in the number of phones used.

Table 3 shows the relationship between the number of mobiles enjoyed and the reported problematic WhatsApp use. While adolescents who have had only one mobile reported an average of 13% problematic use, the percentage soared to 41.5% among those students who have had six mobiles. Classifying the students into just two groups, those who have had three mobiles or fewer, and

Table 3
Totals, frequencies and chi square test of strategies, modelling and number of mobiles

		N	%	Problematic WhatsApp use	Chi	p
Strategy adopted	Strict	292	25.5%	7.5%	129.51	0.00
	Moderate	473	41.4%	20.1%		
	Lax	379	33.1%	44.1%		
	Total	1,44		24.8%		
Modelling	Parents at dinner without mobile	944	82.5%	23.9%	2.26	0.13
	Parents at dinner with mobile	200	17.5%	29.0%		
	Total	1,144		24.8%		
Number of mobiles	Less than three mobiles	700	61.2%	19.0%	3.84	1.01
	1 mobile	46	4.0%	13.0%		
	2 mobiles	301	26.3%	16.9%		
	3 mobiles	353	30.9%	21.5%		
	More than three mobiles	444	38.8%	34.0%		
	4 mobiles	208	18.2%	29.3%		
	5 mobiles	106	9.3%	34.0%		
	6 mobiles	130	11.4%	41.5%		
	Total	1,144		24.8%		

Table 4
Spearman's Rho between habits and problematic WhatsApp use

Variable	Spearman's rho	Problematic WhatsApp use
1. Primer action of the morning	Correlation coefficient	0.372(**)
	Sig. (bilateral)	0.000
	N	1,144
2. Message before 8 a.m.	Correlation coefficient	0.182(**)
	Sig. (bilateral)	0.000
	N	1,144
3. Dinner with phone	Correlation coefficient	0.163(**)
	Sig. (bilateral)	0.000
	N	1,144
4. Phone always carried	Correlation coefficient	0.340(**)
	Sig. (bilateral)	0.000
	N	1,144
5. Message after 10 p.m.	Correlation coefficient	0.262(**)
	Sig. (bilateral)	0.000
	N	1,144
6. Phone not turned off	Correlation coefficient	0.119(**)
	Sig. (bilateral)	0.000
	N	1,144
7. Sleeping with phone	Correlation coefficient	0.127(**)
	Sig. (bilateral)	0.000
	N	1,144
8. Parents at dinner with phone	Correlation coefficient	0.044
	Sig. (bilateral)	0.133
	N	1,144
9. More than three phones	Correlation coefficient	0.169(**)
	Sig. (bilateral)	0.000
	N	1,144

Note. ** Correlation is significant at 0.01 (bilateral).

Table 5
Estimated parameters of problematic WhatsApp use model

Variable	Uso problemático WhatsApp		
	(modelo 1)	(modelo 2)	(modelo 3)
Stimulation: number of phones	0,15009***	0,14753***	0,02816
	(0,02585)	(0,02601)	(0,02522)
Modelling: parents have phone at dinner		0,02969	-0,00343
		(0,03338)	(0,03083)
ET strategy: First action			0,23700***
			(0,02738)
Message before 8 a.m.			0,09270***
			(0,02345)
Phone always carried			0,16437***
			(0,02564)
Dinner with phone			0,04426
			(0,03510)
Message after 10 p.m.			0,11520***
			(0,02468)
Not turning phone off			-0,01007
			(0,02542)
Sleeping with phone			-0,00931
			(0,02529)
Constant	0,19***	0,18580***	-0,01701
	(0,01611)	(0,01679)	(0,02361)
R2	0,0287	0,0293	0,2201
Observations	1.144	1.144	1.144

Note. * $p < .1$; ** $p < .05$; *** $p < .01$.

those who have had more, we observe that the problematic use of WhatsApp is 19% in the first case, and 34% in the second.

Regarding the reliability of the data presented, it should be noted that, after carrying out the chi-square tests in each of the variables analysed, the level of significance value was greater than 0.05 in all cases, with the exception of these variables, related to restrictive mediation (see Table 2): checking WhatsApp first thing ($p = 0.01$) and sending the first message before 8 a.m. ($p = 0.01$); the same applies to the strategies adopted, as reflected in Table 3 ($p = 0.00$).

Table 4 shows the results obtained in the analysis of the relationship between the variables using the Spearman's Rho test. In the case of problematic WhatsApp use, the results showed a significant Spearman correlation at the 0.01 level with all the variables except for whether the parents use the mobile phone during dinner.

To understand the size and relationship between the variables presented above and the main variable in this study (the problematic use of WhatsApp among young people in the second year of secondary education), a logistic regression analysis was carried out. Because the variables are dichotomous, the logistic regression model used for this study was the logit model.

Table 5 shows three models. The first shows a positive and significant relationship between stimulation (having enjoyed more than three mobiles) and problematic WhatsApp use. The second model examines the size and relationship of stimulation (number of cell phones enjoyed) and modelling (example of the parents themselves) with problematic WhatsApp use. As the table shows, the two variables have a positive and significant relationship with the level of problematic use reported among students. Finally, the third model presents all the independent variables to be studied, hence the restrictive strategy comprising the seven variables presented is added to stimulation and modelling. Of these seven variables, four have a positive and significant relationship. These are: checking WhatsApp first thing in the morning, sending the first message before 8 a.m., always carrying the mobile, and sending the last WhatsApp message after 10 at night. According to this model, there was an association between the level of restrictive mediation by parents and adolescents' problematic WhatsApp use.

Discussion

The objective of this article was to examine the relationship between problematic WhatsApp use among adolescents and their parents' educational role through three strategies (restrictive mediation, modelling and stimulation), using a sample of 1,144 Spanish adolescents. The article contributes to advancing the literature on parental mediation and the problematic use of new technologies among adolescents, especially the use of WhatsApp, given its importance compared to other social networks (García-Jiménez et al., 2020) and the paradoxically low level of attention paid to it in the literature (Tresáncoras et al., 2017).

In line with previous studies in Spain, which confirmed that between 85.2% and 91.7% of adolescents had their own mobile phone (Besolí et al., 2018; Golpe, Gómez, Braña, Varela & Rial, 2017), this study, with a slightly younger age cut-off, found that on average across the three academic years (2015-2018), 79% of adolescents aged between 13 and 14 years had their own mobile phone, reaching 81.9 % in the 2017/18 academic year. According to the Spanish national office of statistics (INE), in 2018, 86.2% of 13-year-olds had a mobile (Instituto Nacional de Estadística, 2018), not an entirely different result. Regarding the use of WhatsApp, our results show that 73.9% of adolescents had this application. In other Spanish studies, with larger age samples, similar results were found. For example, in a study with 411 students aged between 0 and 18 years, 74.6% reported always or almost always using instant messaging (Besolí et al., 2018). In another study with a sample of 524 adolescents from first to fourth year of compulsory secondary education in the Community of Madrid, 83.3% confirmed using WhatsApp on a daily basis (García-Jiménez et al., 2020). Finally, a study with more than 40,000 Spanish students aged between 12 and 17 years revealed that 90.6% used WhatsApp (Golpe et al., 2017).

Despite the intensive and massive use of WhatsApp, occupying up to 20% of daily online use (Montag et al., 2015), there has been very little research on implications and problematic use (Tresáncoras et al., 2017). This, however, is not the case with problematic mobile phone and Internet use, where the literature is rich. According to a review of Spanish empirical studies, problematic mobile phone use ranges from 2.8% to 26.1% among adolescents (Carbonell et al., 2012). In other more recent studies, 21.8% of a sample of young Andalusians had a moderate addiction to mobile phones (Castillo & Ruiz-Olivares, 2019). Another study with a Galician sample of 1,709 students aged between 11 and 17 years, 26.6% reported a problematic use of the Internet (Rial Boubeta, Golpe Ferreiro, Gómez Salgado & Barreiro Couto, 2015). Likewise, a study using the problematic internet use scale (EUPI-a) showed 9% with problematic use, although 16% were likely to be considered problematic users (Golpe et al., 2017). These results were similar to those of another study where 15% of adolescents were categorized as having a high risk of problematic mobile use (Besolí et al., 2018).

In relation to the problematic use of WhatsApp, however, the literature has been very scarce, as previously mentioned. Tresáncoras et al. (2017) found that 6% of a sample of 272 adolescents between the ages of 12 and 17 in the province of Alicante suffered from problematic WhatsApp use. In our case, the percentage is considerably higher, approaching 25%, revealing a potential problem that others have already pointed out. For example, a very recent study found that 22.3% of adolescents confessed to being nervous without access to WhatsApp (García-Jiménez et al., 2020). Despite the difficulty in comparing the results with other recent studies, given the different instruments and age cut-offs in the sample, our study suggests that a sizeable percentage of adolescents could be suffering from problematic WhatsApp use.

Furthermore, the results suggest a link between the problematic use of WhatsApp and the mediating role of parents, a crucial role in all preceding great technological irruptions, such as television or video games (Nathanson, 1999; Shin & Huh, 2011). In the case of problematic use of the mobile or any of its applications, there is greater complexity, since the portability of the device, the multiplicity of uses, and solitary and individual use make parental management difficult. For this reason, it is necessary to continue advancing in the research that sheds light on how to improve the management of technology use by adolescents. In our case, the study shows a positive relationship between three types of strategies (restrictive, modelling and stimulation) and problematic WhatsApp use.

In the Spanish context, 51% of adolescents indicate that parents limit their use of the Internet, and 47.9% control their mobile phone (Golpe et al., 2017). Although the majority of parents prefer active to restrictive or technological mediation (Martínez et al., 2020), restrictive mediation seems to be the most efficient (Kirwil et al., 2009). In our case, we found a link between the level of restriction and the problematic use of WhatsApp, that is, the less strict (for example, sleeping with the mobile), the more likely it is that problematic use of WhatsApp is reported, although causality cannot be determined.

Another novelty of the study is that it examined the relationship between the problematic use of WhatsApp among adolescents and *modelling* (parental example) and *stimulation* (number of mobiles owned). Parental modelling is one of the seven strategies that emerged from a study with parents of children in primary education (Bartau-Rojas et al., 2018) and involves understanding the importance of teaching by example. It is assumed that the way parents use WhatsApp and the mobile phone will affect how their children use them. Although the percentage of parents using their mobile while having dinner was low (17%), there was a positive relationship with the problematic use of WhatsApp by their sons and daughters. Finally, this study examined stimulation, understood to be an indirect and unconscious strategy explaining how the number of mobiles owned can lead to greater use, and consequently to more probabilities of problematic use. Our study confirmed the relationship between the number of phones enjoyed and the problematic use of WhatsApp. Students who have had more mobiles are those who reported more problematic use; once again, causality cannot be discerned. Our results are in line with Castillo and Ruiz-Olivares (2019), who found a positive relationship between having enjoyed more than two phones and their problematic use.

Limitations and outlook

Despite its threefold contribution to advancing research on the educational role of parents and problematic technology use by adolescents, by firstly examining the relationship between parental mediation and WhatsApp ignored in the literature, secondly adding the two very little explored strategies of modelling and stimulation, and thirdly using the voices of adolescents themselves to understand the educational role of parents, this study is not without limitations.

Among these, the first to be highlighted is the lack of causality. The study does not allow us to know whether parents using a more restrictive strategy is already the result of problematic use by their children, or whether parents who perceive that their children have the ability to control and regulate their use of the Internet impose fewer rules (Padilla-Walker & Coyne, 2011). Therefore, the study is unable to observe the dynamics of parental mediation, which has very often been presented as a set of preconceived rules or strategies that are implemented or not, but which we think is better defined by a dynamic process based on the daily interaction between parents and adolescents (Symons et al., 2017).

Second, the main variable of the study, problematic WhatsApp use, is based on a single self-reported item. It would be very valuable in future research to be able to use validated scales. One option could be to adapt the already validated scales of problematic mobile phone use (Bianchi & Phillips, 2005; Billieux, Van Der Linden & Rochat, 2008; López-Fernández, Honrubia-Serrano & Freixa-Blanxart, 2012) to the problematic use of WhatsApp.

Third, the study does not examine other sociodemographic variables such as gender or parents' educational level, which could be of great interest (Golpe et al., 2017). Some studies, for example, suggest that being a girl is linked to problematic mobile phone use (Castillo & Ruiz-Olivares, 2019).

Fourth, using the adolescents' own "voices" is one of the novelties of the study, but it can also be a limitation given that while parents tend to overestimate their educational role, adolescents tend to underestimate it (Martínez et al., 2020). Likewise, it should be noted that the same educational style is not usually observed by both parents in a coherent and consistent manner over time, and may in many cases be at the level of anecdotal coincidence.

Fifth, we do not know the potential influence of the classroom teacher at the time of survey completion. Some students may have felt vulnerable by the fact that their class teacher, walking around the room, could see some of their answers.

Despite all these limitations, this research provides new evidence of the importance of the educational role of the family in the management and use of technology by adolescents, pointing to the need to continue investigating the new challenges and the educational role of parents in the digital age.

Future research would ideally analyse the relationship between problematic WhatsApp use and variables such as anxiety and/or day-to-day dysfunction due to using or not being able to use the application. Moreover, it would also be very interesting to understand the influence of gender on problematic WhatsApp use. We also think that a study contrasting the voices of the parents and those of their children in relation to the parental mediation would be very necessary.

While aware of the stated limitations of the study, possible implications for contemporary families can be discerned. Parental mediation seems to be important. It would therefore be interesting to offer tools so that the fathers and mothers themselves can know what their own

parental mediation strategy is and that other alternatives exist.

The problematic use of WhatsApp and mobile phones seems to be a problem among a not insignificant percentage of adolescents. This is a very fragile time of life, and therefore, it would be good to offer young people spaces for reflection on their own use, and where possible, alleviate the distress that it can generate.

Acknowledgments

The authors would like to thank all those directly responsible for the schools participating in the study. All authors declare that they have not received any financial support for this study.

Conflict of interests

The authors declare no conflict of interest.

References

Agar, J. (2013). *Constant touch: A global history of the mobile phone*. London, UK: Icon Books.

Bartau-Rojas, I., Aierbe-Barandiaran, A. & Oregui-González, E. (2018). Mediación parental del uso de Internet en el alumnado de Primaria: Creencias, estrategias y dificultades. *Comunicar*, *54*, 71–79.

Berríos, L., Buxarrais, M.-R. & Garcés, M.-S. (2015). Uso de las TIC y mediación parental percibida por niños de Chile. *Comunicar*, *23*, 161–168. doi:10.3916/C44-2015-17.

Besolí, G., Palomas, N. & Chamarro, A. (2018). Uso del móvil en padres, niños y adolescentes: Creencias acerca de sus riesgos y beneficios. *Aloma: Revista de Psicologia, Ciències de l'Educació i de l'Esport*, *36*, 29–39.

Bianchi, A. & Phillips, J. G. (2005). Psychological predictors of problem mobile phone use. *CyberPsychology & Behavior*, *8*, 39–51.

Billieux, J., Van Der Linden, M. & Rochat, L. (2008). Problematic Mobile Phone Use Questionnaire (PMPUQ). *APA PsycTests*. doi:10.1037/t75370-000.

Carbonell, X., Fúster, H., Chamarro, A. & Oberst, U. (2012). Adicción a internet y móvil: Una revisión de estudios empíricos españoles. *Papeles Del Psicólogo*, *33*, 82–89.

Castillo, M. & Ruiz-Olivares, R. (2019). La percepción de riesgo y su relación con el uso problemático del teléfono móvil en adolescentes. *Revista Española de Investigaciones Sociológicas*, *168*, 21–34. doi:10.5477/cis/reis.168.21.

Centro de Investigaciones Sociológicas. (2015). Barómetro de Marzo 2015. Estudio nº 3057. http://datos.cis.es/pdf/Es3057mar_A.pdf.

Chatterjee, S., Palmer, L. & Goetz, J. (2012). Individual wealth accumulation: Why does dining together as a family matter? *Applied Economics Research Bulletin*, *8*, 1–22.

Chng, G. S., Li, D., Liau, A. K. & Khoo, A. (2015). Moderating effects of the family environment for parental mediation and pathological internet use in youths. *CyberPsychology & Behavior*, *18*, 30–36.

Chóliz, M., Villanueva, V. & Chóliz, M. C. (2009). Ellas, ellos y su móvil: Uso, abuso (¿y dependencia?) del teléfono móvil en la adolescencia. *Revista Española de Drogodependencias*, *34*, 74–88.

Condeza, R., Herrada-Hidalgo, N. & Barros-Friz, C. (2019). Nuevos roles parentales de mediación: Percepciones de los padres sobre la relación de sus hijos con múltiples pantallas. *El Profesional de La Informacón*, *28*, e280402. doi:10.3145/epi.2019.jul.02.

Eisenberg, M. E., Olson, R. E., Neumark-Sztainer, D., Story, M. & Bearinger, L. H. (2004). Correlations between family meals and psychosocial well-being among adolescents. *Archives of Pediatrics & Adolescent Medicine*, *158*, 792–796.

Fischler, C. (2011). Commensality, society and culture. *Social Science Information*, *50*, 528–548. doi:10.1177/0539018411413963.

García-Jiménez, A., López-de-Ayala López, M. C. & Montes-Vozmediano, M. (2020). Características y percepciones sobre el uso de las plataformas de redes sociales y dispositivos tecnológicos por parte de los adolescentes. *ZER - Revista de Estudios de Comunicación*, *25*, 269–286. doi:10.1387/zer.21556.

Garmendia Larrañaga, M., Casado del Río, M. Á. & Martínez Fernández, G. (2015). Parental mediation strategies in Spain: Predicting factors for different strategies. *Zer: Revista de Estudios de Comunicación*, *20*, 13–27.

Golpe Ferreiro, S., Gómez Salgado, P., Kim Harris, S., Braña Tobío, T. & Rial Boubeta, A. (2017). Diferencias de sexo en el uso de internet en adolescentes españoles. *Behavioral Psychology/ Psicologia Conductual*, *25*, 129–146.

Golpe, S., Gómez, P., Braña, T., Varela, J. & Rial, A. (2017). Relación entre el consumo de alcohol y otras drogas y el uso problemático de Internet en adolescentes. *Adicciones*, *29*, 268–277. doi:10.20882/adicciones.959.

Instituto Nacional de Estadística. (2018). Encuesta sobre equipamiento y uso de tecnologías de información y comunicación en los hogares. https://www.ine.es/prensa/tich_2018.pdf.

Instituto Nacional de Estadística. (2020). Encuesta sobre equipamiento y uso de tecnologías de información y comunicación en hogares. https://www.ine.es/prensa/tich_2020.pdf.

Kirwil, L., Garmendia, M., Garitaonandia, C. & Martínez Fernández, G. (2009). Parental mediation. In S. Livingstone

& L. Haddon (Eds.), *Kids online: Opportunities and risks for children* (pp. 99–115). Bristol, UK: The Policy Press.

Klemens, G. (2014). *The cellphone: The history and technology of the gadget that changed the world*. Jefferson, NC: McFarland & Company.

Livingstone, S., Haddon, L., Görzig, A. & Ólafsson, K. (2011). *EU kids online: Final report*. London, UK: EU Kids Online, London School of Economics & Political Science.

Livingstone, S. & Helsper, E. J. (2008). Parental mediation of children's Internet use. *Journal of Broadcasting & Electronic Media*, *52*, 581–599. doi:10.1080/08838150802437396.

López de Ayala, M. C. & Ponte, C. (2016). La mediación parental de las prácticas online de los menores españoles: Una revisión de estudios empíricos. *Doxa Comunicación. Revista Interdisciplinar de Estudios de Comunicación y Ciencias Sociales*, *23*, 13–46.

López-Fernández, O. (2017). Short version of the Smartphone Addiction Scale adapted to Spanish and French: Towards a cross-cultural research in problematic mobile phone use. *Addictive Behaviors*, *64*, 275–280. doi:10.1016/J.ADDBEH.2015.11.013.

López-Fernández, O., Honrubia-Serrano, M. L. & Freixa-Blanxart, M. (2012). Adaptación española del "Mobile Phone Problem Use Scale" para población adolescente. *Adicciones*, *24*, 123-130. doi:10.20882/adicciones.104.

Malvini Redden, M. & Way, A. K. (2016). "Adults don't understand": Exploring how teens use dialectical frameworks to navigate webs of tensions in online life. *Journal of Applied Communication Research*, *45*, 21–41. doi:10.1080/00909882.2016.1248465.

Martínez, G., Casado, M. Á. & Garitaonandia, C. (2020). Estrategias online de mediación parental en contextos familiares de España. *Comunicar*, *28*, 67–76. doi:10.3916/C65-2020-06.

Masip, M. & Balagué, I. (2015). *El uso del teléfono móvil en España*. Barcelona: Instituto Psicológico Desconect@.

Montag, C., Błaszkiewicz, K., Sariyska, R., Lachmann, B., Andone, I., Trendafilov, B.,… Markowetz, A. (2015). Smartphone usage in the 21st century: Who is active on WhatsApp? *BMC Research Notes*, *8*, 331. doi:10.1186/s13104-015-1280-z.

Nathanson, A. I. (1999). Identifying and explaining the relationship between parental and mediation and children's agression. *Communication Research*, *26*, 124–143.

Nathanson, A. I. (2001). Parent and child perspectives on the presence and meaning of parental television mediation. *Journal of Broadcasting & Electronic Media*, *45*, 201–220. doi:10.1207/s15506878jobem4502_1.

Padilla-Walker, L. M. & Coyne, S. M. (2011). " Turn that thing off!" parent and adolescent predictors of proactive media monitoring. *Journal of Adolescence*, *34*, 705–715. doi:10.1016/j.adolescence.2010.09.002.

Panova, T. & Carbonell, X. (2018). Is smartphone addiction really an addiction? *Journal of Behavioral Addictions*, *7*, 252–259. doi:10.1556/2006.7.2018.49.

Pedrero Pérez, E. J., Morales Alonso, S. & Ruíz Sánchez de León, J. M. (2021). Obsesión y compulsión en el uso/abuso del móvil: El OCDUS-TIC. *Adicciones*, *33*, 149–160. doi:10.20882/adicciones.1320.

Pedrero Pérez, E. J., Rodríguez Monje, M. T. & Ruiz Sánchez De León, J. M. (2012). Adicción o abuso del teléfono móvil. Revisión de la literatura. *Adicciones*, *24*, 139–152. doi:10.20882/adicciones.107.

Rial Boubeta, A., Golpe Ferreiro, S., Gómez Salgado, P. & Barreiro Couto, C. (2015). Variables asociadas al uso problemático de internet entre adolescentes. *Salud y Drogas*, *15*, 25–38.

Ruiz-Ruano García, A. M., López-Salmerón, M. D. & López Puga, J. (2020). Evitación experiencial y uso abusivo del smartphone: Un enfoque bayesiano. *Adicciones*, *32*, 116–127. doi:10.20882/adicciones.1151.

Sánchez-Romero, C. & Álvarez-González, E. (2018). Actitudes nocivas y riesgos para los menores a través de los dispositivos móviles. *Revista de Estudios y Experiencias En Educación*, *3,* 147–161.

Shin, W. & Huh, J. (2011). Parental mediation of teenagers' video game playing: Antecedents and consequences. *New Media & Society*, *13*, 945–926.

Symons, K., Ponnet, K., Walrave, M. & Heirman, W. (2017). A qualitative study into parental mediation of adolescents' internet use. *Computers in Human Behavior*, *73*, 423–432. doi:10.1016/j.chb.2017.04.004.

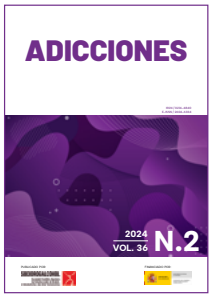
Taverns, E. M., Rifas-Shiman, S. L., Berkey, C. S., Rockett, H. R. H., Field, A. E., Eindsay Frazier, A.,… Gillman, M. W. (2005). Family dinner and adolescent overweight. *Obesity Research*, *13*, 900–906. doi:10.1038/oby.2005.104.

Torrecillas-Lacave, T., Encina Morales de Vega, M. & Vázquez-Barrio, T. (2017). Mediación familiar en el uso de servicios digitales por menores escolarizados. *Estudios Sobre El Mensaje Periodístico*, *23*, 663–673. doi:10.5209/ESMP.55620.

Tresáncoras, A. G., García Oliva, C. & Piqueras Rodríguez, J. A. (2017). Relación del uso problemático de Whatsapp con la personalidad y la ansiedad en adolescentes. *Salud y Drogas*, *17*, 27–36.

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

ADICCIONES
2024 ■ VOL. 36 ■ N. 2 ■ PAGES 189–198
www.adicciones.es



ORIGINAL

Chemsex in Barcelona: A qualitative study of factors associated with the practice, the perception of the impact on health and prevention needs

Chemsex en Barcelona: Estudio cualitativo sobre factores asociados a la práctica, percepción del impacto en salud y necesidades de prevención

Juan M. Leyva-Moral*, Mariela Aguayo-González*, Rubén Mora**, Luis Villegas**, Rebeca Gómez-Ibáñez*, Olga Mestres-Soler*, Rubén Maldonado-Alia*, Nicolas Lorente***, Cinta Folch****, *****.

* Universitat Autònoma de Barcelona, Departamento de Enfermería, Facultad de Medicina. Cerdanyola de Valles, España.

** Stop Sida. Barcelona, España.

*** Laboratoire de recherche communautaire, Coalition PLUS, Pantin, France.

**** Centre d'Estudis Epidemiològics sobre les Infeccions de Transmissió Sexual i Sida de Catalunya (CEEISCAT), Departament de Salut, Generalitat de Catalunya, Badalona, España.

***** Centro de Investigación Biomédica en Red de Epidemiología y Salud Pública (CIBERESP), Madrid, España.

Abstract

Chemsex is defined as use of psychoactive drugs with the aim of having sexual relations between gay men, bisexuals and men who have sex with men for a long period of time. To study this phenomenon, this qualitative descriptive study was proposed with the objective of describing the practice of chemsex from the perspective of users, to determine the main factors associated with its practice, the perception of the impact on their health and to establish prevention needs. Data were obtained using conversational techniques: 12 semi-structured interviews and 3 focus groups. The purposive sample was made up of GBMSM with a mean age of 40.1 years, 78% born in Spain, and 68% with completed university studies. The qualitative analysis focused on three thematic areas: factors associated with the practice of chemsex, the impact of chemsex on health, and prevention and risk reduction needs. It is concluded that the practice of chemsex should be understood as multifactorial and multicausal, associated with the sociocultural context. Sexual satisfaction, increased libido and the search for more intense pleasure are identified as key factors among people who practice it. These men are still scared of being judged, even by specialists who may lack knowledge or training. A reanalysis and rethinking of the interventions and policies directed towards this population is necessary, putting the focus of action on shared decision-making, self-care, cultural competence and the humanization of care.

Keywords: chemsex, sexual health, qualitative research

Resumen

El chemsex se define como el uso de drogas psicoactivas con el objetivo de mantener relaciones sexuales entre hombres gay, bisexuales y otros hombres que tienen sexo con hombres (GBHSH), por un largo periodo de tiempo. El objetivo de este estudio cualitativo exploratorio es describir la práctica del chemsex desde la perspectiva de los usuarios, determinar los principales factores asociados a su práctica, la percepción del impacto en su salud y establecer necesidades de prevención. Se obtuvieron los datos mediante técnicas conversacionales: 12 entrevistas semiestructuradas y 3 grupos focales. El análisis cualitativo se centró en tres áreas temáticas: factores asociados a la práctica de chemsex, impacto del chemsex en la salud y necesidades prevención y reducción de riesgos. La muestra intencionada fue conformada por hombres GBHSH con una edad media de 40,1 años, 78% nacidos en España, y 68% con estudios universitarios finalizados. Los resultados del estudio ponen de manifiesto que la práctica de chemsex debe comprenderse como multifactorial y multicausal, y asociada al contexto sociocultural. La satisfacción sexual, del aumento de la libido y de la búsqueda de placer más intenso se identifican como factores clave entre las personas que lo practican. Sigue existiendo miedo en estos hombres a ser juzgados, incluso por los especialistas que pueden carecer de conocimiento o formación. Es necesario un reanálisis y replanteamiento de las intervenciones y políticas dirigidas hacia esta población, poniendo el foco de acción en la toma de decisiones compartidas, el autocuidado, la competencia cultural y la humanización del cuidado.

Palabras clave: chemsex, salud sexual, investigación cualitativa

■ *Received: January 2022; Accepted: September 2022.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Juan M. Leyva-Moral. Universitat Autònoma de Barcelona, Departamento de Enfermería, Facultad de Medicina. Avda. Can Domènech s/n. Edificio M. Despacho M2-213. Bellaterra, 08193. Email: Juanmanuel.leyva@uab.cat

In the Spanish context, chemsex is defined as the "*intentional use of drugs to have sexual relations for a long period of time (which can last from several hours to several days)*" (Fernández-Dávila, 2016a: 44) especially among gay men, bisexual and other men who have sex with men (GBMSM) (Bourne, Reid, Hickson, Torres-Rueda & Weatherburn, 2015; Weatherburn, Hickson, Reid, Torres-Rueda & Bourne, 2017). However, there is no agreed and internationally accepted definition (Ministry of Health, 2020a). The primary goal of the practice is to facilitate, initiate, prolong, maintain, and intensify sexual encounters (Bourne et al., 2015; Public Health England, 2015). Aspects such as increased libido, confidence, disinhibition, feeling more attractive, and heightened physical sensations have also been identified as motivating factors for practising chemsex (Weatherburn et al., 2017). Chemsex can be practised in spaces such as private sex parties (one-on-one sessions, threesomes, group sex) and/or commercial premises where sex is practised (saunas, sex-clubs) (Fernández-Dávila, 2016a, 2016b). The concept of chemsex is socially constructed, based on user preferences and the availability and popularity of certain drugs; the defining characteristics are thus determined by the socio-cultural context and the duration of use (Benotsch, Lance, Nettles & Koester, 2012).

The prevalence of chemsex is given in the literature with figures varying widely from 3% to 29% of MSM (Druckler, van Rooijen & de Vries, 2018; Frankis, Flowers, McDaid & Bourne, 2018; Glynn et al., 2018; Hammoud et al., 2018; Hegazi et al., 2017; Pakianathan et al., 2018; Rosińska et al., 2018), and the most commonly used substances are methamphetamine, mephedrone and GHB/GBL in Anglo-Saxon contexts (Druckler et al., 2018; Frankis et al., 2018; Glynn et al., 2018; Hegazi et al., 2017; Melendez-Torres, Hickson, Reid, Weatherburn & Bonell, 2016; Pakianathan et al., 2018).

The fact that the practice and its impact has been spreading and becoming more visible has led to chemsex being addressed as a phenomenon coexisting alongside other sexual behaviours and substance use in this group (Folch et al., 2015; Ministry of Health, 2020b; Soriano, 2017). In countries such as the United States, where methamphetamine use among GBMSM is nothing new, it has become a public health problem (Halkitis, Parsons & Stirratt, 2001; Worth & Rawstorne, 2005). In the United Kingdom, the administration of these substances intravenously (slamming) has grown alarmingly in recent years, resulting in important biopsychosocial consequences such as rapid addiction, great difficulty in having sexual relations while sober, high risk of HIV and HCV infection, or acquisition of other sexually transmitted infections (STIs) (Gilbart et al., 2015; Hegazi et al., 2017; Petersson, Tikkanen & Schmidt, 2016; Rogstad, 2016). Likewise, the practice of chemsex has been associated with overdose, attempted suicide, strong addiction, mental health problems, lower professional or academic performance, interference in social and affective life, and legal and financial problems (Ministry of Health, 2020b).

Given the subjectivity associated with the practice of chemsex and its evident relationship with the context in which it takes place, the phenomenon needs to be explored from the perspective of GBMSM who practise it. In this way, updated, realistic and contextual information will be obtained which is crucial for understanding the phenomenon and thus the ability to identify important aspects for managing possible health interventions. Consequently, the objective of this study is to describe the practice of chemsex from the perspective of users to deepen the understanding of the factors associated with the practice, the perception of the impact on health, and prevention requirements.

Method

This is a qualitative descriptive study in which GBMSM chemsex users were invited to participate by intentional sampling, through the NGO Stop Sida (Barcelona), and by chemsex users trained as volunteers and integrated into the Stop Sida ChemSex Support commission.

Stop Sida is a community-based organization addressing sexual health for and from the perspective of the LGTBI+ community since 1986. In 2015, the ChemSex Support Service was created with a team of LGTB professionals (psychologists, social workers and community agents) responding to the needs expressed by users coming to the organisation. In this state-wide service, psychological care is offered to individuals or groups, both in person and by video call, in addition to social and work-related care. Since 2020, training in approaching chemsex and promoting sexual health has been available to users of the service who could then became volunteer members of the entity and join the decision-making bodies of the NGO. These volunteers offer information on risk reduction, accompaniment in managing chemsex, leisure activities and spaces for exchanging experiences and emotional support. During 2020, 112 health professionals were trained in the approach to chemsex, peer-to-peer information was offered to 214 users, 88 new chemsex users received psychological care (1,572 individual interventions), and 10 chemsex users were trained as volunteers of the service.

The data was collected using two conversational techniques: semi-structured interviews and focus groups (FG) conducted in December 2020 and lasting approximately 80 minutes. The interview question script (Table 1) and the areas to be explored in the FGs (Table 2) were drawn up based on the needs of the research team; they were agreed upon and verified by the team before beginning the data collection (Polit & Beck, 2017).

The interviews and FGs were carried out by two researchers with previous experience in the subject in a private and secure room, arranged for this purpose at the Stop Sida facilities. In the FGs, one researcher moderated the session while the other only observed and recorded the non-verbal details, disagreement, agreement, etc., occurring during the session (Krueger & Casey, 2015). All conversations were audio recorded and transcribed verbatim immediately afterwards. Participation in the study was voluntary, as was withdrawal. Participants received an incentive of €25 at the end of their participation. Written informed consent was obtained once the details of the study had been explained and any possible doubts resolved. The data was kept in a secure digital space, accessible only to the research team. No data was recorded that could reveal the identity of the participants.

Data were analyzed in parallel by two researchers (JLM and MAG) following the thematic content analysis method proposed by Braun and Clarke (2012). This method comprises six steps whose main characteristics are summarized in Table 3.

Table 1
Semi-structured interview script

1. Please, talk about what chemsex means to you.
2. What effects do you look for when you use drugs during your sexual relations?
3. What impact does the practice of chemsex have on your life?
4. At what age did you have sex under the influence of drugs for the first time? What led you to start? Important people, source, places...
5. How do you get the drugs?
6. What would you say is the reason why you do chemsex? What benefits do you find? And drawbacks?
7. What moments, situations or factors do you think more it more favourable? And which make it difficult?
8. Are you worried about your drug use? Why?
9. In what aspects? (studies, work situation, physical appearance, income, relationships with friends, family, partner, life plans ... problems with your boss, authorities).
10. Have you talked to anyone about chemsex? With whom? What makes it easy for you to talk about chemsex and what makes it hard for you?
11. Is there something that worries you in terms of mental health and substance use? Tell me about it, why, what do you need ...
12. Currently, if you think about consulting a professional for a mental health problem, what would lead you to do so? Where would you go? Why?
13. Do you think you have enough information to manage the pleasures and reduce the risks when practising chemsex? Why?
14. Where do you usually get that information from? Do you check it in any way?

The Atlas.ti® computer program was used to analyze the data. Verbatim extracts from the interviews were included to illustrate the findings. Interviews were conducted until the data became repetitive, that is, when data saturation was reached (Saunders et al., 2018). On obtaining the first version of the results, these were discussed and agreed upon by the group in several discussion sessions. The study was approved and financed by the Government Delegation for the National Plan on Drugs.

Table 2
Areas explored in the focus groups

1. Motivations for the practice of chemsex.
2. What happens in a chill-out?
3. What are the best and worst aspects of chemsex?
4. Starting chemsex.
5. Management of chemsex. Beginning, end and possible complications.
6. The days after practising chemsex. Emotional, social and physical management.
7. Chemsex and gay identity.
8. Management of HIV and other STIs.
9. Health care.

Table 3
Methodological characteristics of the thematic analysis

Step	Necessary Actions
Familiarization with the data	- Data transcription. - Reading and rereading of the texts. - Identification of initial ideas.
Coding	- Systematic encoding the relevant fragments of the entire text. - Checking the relevant contents of each code.
Categorization	- Grouping codes by similarities.
Review of the categories	- Checking if the categories are related to the assigned codes and to the totality of the data. - Making a category map.
Definition and name of the categories	- Dynamic analysis to refine specificities of each category and of the final analytical product by providing a clear definition and name for each category.
Report Writing	- Selection of exemplary significant extracts. - Relating the findings to the research question to proceed with final report writing.

Results

Twelve individual interviews and three focus groups were conducted with five, five and eight participants, respectively. They are a sample of male chemsex users who identified themselves as GBMSM, with a mean age of 40.1 years, 78% born in Spain, 68% with completed university studies, 81.8% in active employment with an average monthly net income of €1,483.33, mostly living independently (54.54%). In the last 4 weeks, the participants reported having attended an average of 6.08 chill-outs (chemsex sessions), in which the substances most consumed were methamphetamine (tina) (77.27%), gamma hydroxybutyrate (GHB, G, liquid ecstasy) (81.81%) and ketamine (27.27%).

Factors associated with the practice of chemsex

Access to substances was described as easy. It only requires having the right contact that supplies them. Usually, these contacts are acquaintances of friends who also use. Another common option is to obtain the substances at the chill-out itself, where it is known that the substance can be obtained before going.

I go to a chill-out and I put in my money, but instead of taking my things [drugs] I get them through a contact. Now I already have friends who do this and sell substances (P3).

You can ask anyone "hey, have you got this or that?" ... I have my contacts and well, it's just a case of calling, meeting, buying and that's it. It's very easy, super easy really, just, ok, I want that, and that's it (P8).

Participants agreed that curiosity and the excitement of trying new things appeared to be one of the main reasons for starting chemsex. The great majority had previously used drugs in nightlife spaces, but not associated with sex. The opportunity arises casually and high expectations of obtaining maximum pleasure are generated. It is an act of curiosity, also mediated by group pressure since "*seeing as everyone was doing it, I wanted to try it too*" (P7), or as P8 says, "*I tried it just like that, without thinking. You meet friends, and they're like "you have to try this" and you say "okay". It was a social thing, just among friends (P8)".*

The homophobia experienced by some of the participants, internalized in many cases, is linked to earlier difficulties in being able to develop full sexuality. Frequenting saunas and cruising areas was common in many cases before starting chemsex; as P1 says *"it was something hidden"*. The practice of chemsex is described as something typical of GBMSM, becoming part of the group identity for many of the informants. They do not rule out that heterosexual people may practise it, but not in such a visible, intense and frequent way as among GBMSM.

Things like cruising came from the fact that us homosexuals had to stay hidden; so, habits like a using a dark room started in which the possibility of hiding your identity made sexual encounters more likely. Not having come to terms with the fact of being gay in a healthy way could have something to do with it because when you have a relationship or when you know that you are doing something that is condemned socially, there is undoubtedly an internal issue with guilt that is not clear and that might be linked to nobody judging me in the chill-outs (P1).

I think it's part of the saunas, those kinds of places, the environment. I think taking using drugs to fuck is like, sure, you find it in these gay places, in saunas, parties. I've never come across a party of heterosexuals who do chemsex, the truth is, sure, they take drugs and fuck, yes, but not for the purpose of it (P2).

People who have had a shitty childhood and have been hammered for our sexuality. These types of people sometimes want to lose their inhibitions, and drugs are an easy way ... if you've had all these problems, you think you're inferior, and you have a hell of an insecurity complex that of course also applies to sex. So, when you take drugs, you feel disinhibited and you also feel safe and then you experience more pleasurable sex and when you use drugs, sex feels more powerful (FG3).

Discontent with one's own body, shyness, difficulties in socializing in leisure environments, the desire to show strength and manliness all contribute to beginning the practice of chemsex. Drugs allow informants to socialize easily in a context which they perceive as safe since nobody judges them on their physical appearance. They feel safe knowing that the chill-outs are spaces where they can enjoy sex and where they can connect with others in a more personal way. In addition, drugs offer them the ability to have longer lasting sex, even incorporating practices that would be difficult for them to implement without them (such as fisting).

The novelty; when you are young and discovering your sexuality, well then you get older and it gets less, and you always want to be high and also when you go out partying when you're young with two big drinks inside you, but then, well, when you're 27, well, no and you look for other alternatives, and remember that I was very anti-drug, well anyway, there comes a time when you say damn I'm 27 years old, if I don't try it now! (FG1).

I use drugs to give me confidence. For me, sexual practices don't change, except fisting because I dilate a lot (FG3).

My insecurity goes with me hand in hand. Sometimes I think "it's great that I can fuck this hot guy, he's really stoned" and I attribute it to the fact that he agrees to be with me because that's how it goes (FG2).

Among participants with HIV, the diagnosis also marked a before and after in their lives and in the beginning of the practice. Later, once it became undetectable, they describe that moment as a liberation since they knew that they could no longer become infected nor infect others. Furthermore, chemsex allowed them to interact and obtain pleasure in an environment where they would not be judged.

At that moment HIV came into my life, I felt like an atomic bomb. Chemsex was the space where I didn't have to explain to anyone whether it was positive or not; everyone understood, no one asked. I got involved without thinking, for not explaining something that I was not prepared to give at that moment (FG2).

When they found me [HIV] it was an absolute liberation. I said I'm free now, now I'm undetectable and medicated, so let's enjoy life, with sex and with drugs. It was a real release (FG3).

Health impact of chemsex

Physical fatigue stands out as the main complication, appearing after several sleepless nights, continued drug use and sex. Participants describe this situation as extremely exhausting. The next day, they feel they do not have the physical strength to face family, social or work responsibilities, which has a direct impact on their social relationships, leading to their isolation in many cases. Chemsex also has an emotional impact, since emotional lability after chill-out is common, as well as mood swings.

The hardest thing is when I'm tired, I have to work or pretend I'm fine and it's hard for me, the tiredness issue. Before, I had emotional lows; if I'm partying for three days, the next day I'm not going to go to work, no way, I know I'm going to be sleeping all day, I'm going to be resting, I'm not going to want to get out of bed (P2).

Many times, you start on Friday and finish Sunday afternoon with hardly any sleep, which means tiredness the next day, you're not focused and the opportunity cost, if you spend your time on this, you take it away from friends and family (P3).

With family, friends, questions about what's wrong with you, you're apathetic, are you okay? they ask. The more parties, the bigger the downer (P6).

Some participants are aware of their own process of denial regarding the pattern of use or loss of control, especially with tina. They are aware that chemsex ends up playing an important role in their lives, and this causes anxiety when they reflect on it.

There is a lot of denial about self-control in using tina. There is something very brutal, that is, there are many reactions and what happens is that you deny it and do not control it. That makes you vulnerable, then it's a danger that comes about because you're denying the action that's going on in your life (P1).

Always being worried about this topic, because you talk to friends and say, damn, you really notice that you're hooked (P8).

Other emotional complications identified in the reflections refer to apathy, isolation, difficulty concentrating and understanding, frustration, loneliness and sadness. They also suffer from the fear of feeling judged outside the context of chemsex, especially in the healthcare setting, or from not being able to control their use, guilt and regret.

Let them judge me, that's why I hide it ... I hide it and smoke myself silly with joints, and that's the worst thing because in the end I won't let myself be helped, and as time goes by, I'm more vulnerable and I'm taking drugs more and more and I feel sadder and sadder, more alone (FG3).

I've always been very afraid to go there [drug dependency unit] because I didn't know if the person there would treat me without judging me (FG1).

Participants describe experiencing a higher incidence of secondary STIs when practising chemsex. They report that infections are more frequent and sometimes recurrent; as a consequence, sexual health checks have increased and they have the perception of having more control of their own sexual health.

The frequency with which I might catch an STD has increased. And I have caught them, a few of them, with some frequency, others fortunately not, but I think that, on this STD menu, I have been through most of them. Yes, some more than once (P10).

I think it has been for the better, because for example I hadn't had blood tests for 3 years and now that I've started that again, I've had blood tests again, as I was worried about the sex life I was having, before I didn't care (P2).

The financial impact is important given the price and frequency of use. Depending on income, the costs of use can interfere with the maintenance of basic daily expenses such as housing or food. Participants adopt individualized strategies to obtain more affordable prices.

I have several dealers, I ask about prices, contacts and buy directly (P4).

What always happens, when you use a lot you end up getting favours from the dealer, or you end up changing dealers because of the price. So how much I spend, I'm not really calculating because I don't want to know; between what I earn and how much I spend on rent and food, I don't want the number (P1).

Prevention needs and risk reduction

Strong hangovers were described after chemsex sessions; in most cases these were managed through rest, moderate eating and hydration. Although it was common to spend several nights without sleep, especially at the weekend, participants reported controlling this situation by limiting the number of nights without sleep (usually no more than two). Self-care actions prior to the practice of chemsex were also observed, mainly to prevent complications related to hypoglycemia, hypotension and dehydration.

It's a matter of doing intensive rehydration and trying to regulate circadian patterns again, rest, and then, in a few days you get back to normal (P10).

So, like, for me, it's super important to sleep. I try not to spend a night without sleep, okay, but not two. And I have been doing this lately, spending two nights without sleeping and it has made me feel terrible (P12).

On Saturdays we used to go to the supermarket and buy isotonic drinks so as not to dehydrate ourselves and cokes so that our blood pressure didn't drop, and as with tina sometimes you don't feel like eating, I would buy those jars of baby food with yogurt to improve the bacterial flora (FG1).

Information on drugs was obtained from various sources in an autonomous and sensible way. First indications about the practice were usually obtained through a friend. Participants consult the Internet about effects, routes of administration and secondary effects of the substances to be consumed. Community bodies that help through risk reduction practices and other entities or specialists were also used to obtain help with substance use management. It should be noted that the help obtained from specialists was described as unsatisfactory given the little training shown in this regard; on occasion they themselves felt they had to explain what chemsex is to the professionals. A certain degree of ignorance regarding chemsex was observed on the part of the services that specialized community bodies offer.

The information I look for, on side effects, routes of administration, all that, I already get from there, the effects, the time that needs to pass between doses, those are the things that interest me about drugs, Well, I get it from there [Energy Control] (P2).

Right, well, I met a friend, who stopped me and told me look, this is how you do it, it has to be wet, you wait a while, then it dries, and that's also how you learn. In the group itself, sharing information (P12).

It makes it easier for me to talk when the other person also uses and knows what I'm talking about, talking about it with someone who does chemsex; I have more confidence than if a nurse or whoever comes along, no matter how understanding she is, she's still judging you (P3).

The search for help starts when the need is felt to self-manage the practice, due to side effects or complications or on the advice of someone they know. Such professional help is usually found through acquaintances who have used the services, or on their own initiative after previous experiences with an organisation of which they have good memories. They found it very difficult to talk to their friends about their relationship with drugs and sex, especially among those who practice slamming. They mentioned feeling stigmatized and under the shadow of the injected heroin user stereotype that the 90s left behind.

The fact that I can see I'm not handling drug use well, I can't talk about it with certain friends, with people who also use. With friends who don't use I just can't talk about it. I'd go to a professional to help me manage and control it (P6).

You need tools to be able to manage all this and tools to manage your affections and your emotions or your frustrations, and the desires, the complexes, the difficulties (FG2).

There is quite a lot of prejudice [slamming]; using a needle is associated with heroin (P4).

Discussion

This qualitative study has revealed that one of the factors associated with the practice of chemsex is the ease with which substances and their distributors are accessed, as well as the high frequency of use among GBMSM, as if the practice were part of their identity. This data is consistent with the results of Ahmed et al. (2016), who already showed that drug use among GBMSM was common and normalized in South London. Their study participants reported that between 70% and 90% of MSM in South London took drugs, and the focus groups concluded that the substances were very accessible and that the number of distributors had increased considerably in recent years, both in clubs and dating apps for MSM (Ahmed et al., 2016).

The reasons given for starting chemsex are diverse, with curiosity, excitement, expectations of maximum pleasure, increased confidence and intensified sensations standing out, which coincides with other studies (Ahmed et al., 2016; Bui et al., 2018; Deimel et al., 2016; Hammoud et al., 2018; Prestage et al., 2018; Weatherburn et al., 2017). A belief held by several focus group participants, but reported by only a few interviewees, was that initiation in chemsex was typically the result of stressful life events, such as a relationship break up or an HIV positive diagnosis.

This study shows how many of the participants reported going without sleep for long periods of time, even exceeding 48 hours, with the consequent impact on their social relationships and work and family responsibilities. Evidence shows that methamphetamine users described difficulties maintaining social activities and compliance with daily activities and social networks, with a negative impact on mental health, especially anxiety and depression (Glynn et al., 2018; Hammoud et al., 2018). This study shows that almost half the men highlighted the negative effect of chemsex on their job, on the ability to work effectively and on their professional development. They generally reported being absent from work the day after chemsex due to withdrawal symptoms from the substance(s), poor concentration, and decreased cognitive ability, negatively affecting their performance. Similar findings were found in different contexts, including also an increase in work absenteeism (Hegazi et al., 2017). Along the same lines, the evidence indicates a negative impact on the mental health of people who practice chemsex, especially in terms of depression, anxiety, somatization (Berg, Amunsen & Haugstvedt, 2020; Bohn et al., 2020) and drug dependence (Íncera-Fernández, Gámez-Guadix & Moreno-Guillén, 2021). These data underline the need to offer appropriate mental health services; indeed, the literature shows that one in four chemsex users in the Netherlands expressed the need for specific and culturally adapted mental health services (Evers et al., 2020).

The participants in this study reported having contracted more than one STI, even repeatedly, a fact that is consistent with available evidence which associates the practice of chemsex with previous STI diagnoses (Bourne et al., 2015); the high number of sexual partners during chemsex sessions thus substantially increases the risk of contracting an STI. In addition, evidence shows that chemsex is associated with condomless anal sex (Ahmed et al., 2016; Druckler et al., 2018; Frankis et al., 2018; Glynn et al., 2018; Hoornenborg et al., 2018; Melendez-Torres et al., 2016; Ottaway et al., 2017; Pufall et al., 2016; Pufall et al., 2018; Reback, Fletcher & Swendeman, 2018), and with some extreme sexual practices such as fisting (Ahmed et al., 2016; Frankis et al., 2018; Hegazi et al., 2017; Pakianathan et al., 2018). Other studies show a statistically significant association between the practice of chemsex and anal sex without a condom, detectable HIV viral load, hepatitis C and STIs, with the association increasing among people who practice slamming (Pufall et al., 2018).

This study indicates that the participants did not feel comfortable with health services specialized in addictions, given the lack of training experienced in their visits with health professionals. European data indicate similar findings, with participants not seeking specialized help, believing that they will find models of care focused on disease, a fact that makes them seek help in specialized LGBT associations with staff familiar with the subject (Bourne et al., 2015). This data helps to understand why chemsex users do not exclusively ask for help with detoxification but rather with self-management and harm reduction.

This study has a number of limitations that need to be considered. One of them has to do with the generalizability of the results. Due to the cost involved in probability sampling, it is difficult to obtain a representative sample and, therefore, to generalize the quantitative results. However, the results obtained from this qualitative study will be valid for the participating GBMSM, and as a result of the meanings constructed and shared in social and sexual interaction, their testimonies regarding their experiences of drug use are a sample or reflection of what happens to many other GBMSM who use drugs and practice chemsex. The study design uses a triangulation of methods that allows greater validity of the results to be obtained. Likewise, the current situation given the COVID-19 pandemic may have influenced the results of this study due to the restrictions implemented during this period.

This study concludes that the practice of chemsex, like many other health-related phenomena, must be understood as multifactorial and multicausal, associated with the sociocultural context, so that the management of the phenomenon must be focused and adapted to the needs of each user. Given the particularity of the phenomenon, it is crucial to focus on the understanding of sexual satisfaction, increased libido and the search for more intense pleasure in people who practice chemsex since these are identified as key factors among its practitioners. Consequently, instead of focusing only on the risks associated with chemsex, it is also necessary to work on issues related to desire, excitement, identity and self-image, thereby requiring a transdisciplinary understanding beyond biomedical sciences.

Fear of being judged, even by specialists who may lack knowledge or training in chemsex, remains, and this can limit access to health services. Likewise, there is a lack of accessible professional information sources adapted to the needs of the participants, a fact that leads to self-training, peer teaching and self-management of substance use. A reanalysis and rethinking of the interventions and policies directed towards this population is needed, with a focus of action on shared decision-making, self-care, cultural competence and the humanization of care, leaving aside paternalistic attitudes, verticality and disease-focused care.

Acknowledgments

We wish to express our sincere gratitude to all the users and volunteers of the Stop Sida Chemsex Support Service who participated in this study by voluntarily sharing their personal experiences about chemsex. Likewise, we thank

the Government Delegation for the National Plan on Drugs of the Ministry of Health for the funding received for the study.

Conflict of interests

None were identified.

References

Ahmed, A. K., Weatherburn, P., Reid, D., Hickson, F., Torres-Rueda, S., Steinberg, P. & Bourne, A. (2016). Social norms related to combining drugs and sex ("chemsex") among gay men in South London. *The International journal on drug policy*, *38*, 29–35. doi:10.1016/j.drugpo.2016.10.007.

Benotsch, E. G., Lance, S. P., Nettles, C. D. & Koester, S. (2012). Attitudes toward methamphetamine use and HIV risk behavior in men who have sex with men. *The American Journal on Addictions, 21*, 35-42. doi:10.1111/j.1521-0391.2012.00294.x.

Berg, R. C., Amundsen, E. & Haugstvedt, Å. (2020). Links between chemsex and reduced mental health among Norwegian MSM and other men: Results from a cross-sectional clinic survey. *BMC public health*, *20*, 1785. doi:10.1186/s12889-020-09916-7.

Bohn, A., Sander, D., Köhler, T., Hees, N., Oswald, F., Scherbaum, N.,... Schecke, H. (2020). Chemsex and mental health of men who have sex with men in Germany. *Frontiers in psychiatry*, *11*, 542301. doi:10.3389/fpsyt.2020.542301.

Bourne, A., Reid, D., Hickson, F., Torres-Rueda, S. & Weatherburn, P. (2015). Illicit drug use in sexual settings ('chemsex') and HIV/STI transmission risk behaviour among gay men in South London: Findings from a qualitative study. *Sexually Transmitted Infections*, *91,* 564-568. doi:10.1136/sextrans-2015-052052.

Braun, V. & Clarke, V. (2012). Thematic analysis. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf & K. J. Sher (Eds.), *APA Handbook of research in psichology. Vol. 2. Research designs: Quantitative, qualitative, neuropsychological, and biological* (pp. 57-71). Chicago: American Psychological Association.

Bui, H., Zablotska-Manos, I., Hammoud, M., Jin, F., Lea, T., Bourne, A.,… Maher, L. (2018). Prevalence and correlates of recent injecting drug use among gay and bisexual men in Australia: Results from the FLUX study. *The International journal on drug policy*, *55*, 222–230. doi:10.1016/j.drugpo.2018.01.018.

Deimel, D., Stöver, H., Hößelbarth, S., Dichtl, A., Graf, N. & Gebhardt, V. (2016). Drug use and health behaviour among German men who have sex with men: Results of a qualitative, multi-centre study. *Harm reduction journal*, *13*, 36. doi:10.1186/s12954-016-0125-y.

Druckler, S., van Rooijen, M. S. & de Vries, H. J. C. (2018). Chemsex among men who have sex with men: A sexualized drug use survey among clients of the sexually transmitted infection outpatient clinic and users of a gay dating app in Amsterdam, the Netherlands. *Sexually Transmitted Diseases*, *45*, 325-331. doi:10.1136/sextrans-2020-054840.

Evers, Y. J., Hoebe, C., Dukers-Muijrers, N., Kampman, C., Kuizenga-Wessel, S., Shilue, D.,.. Van Liere, G. (2020). Sexual, addiction and mental health care needs among men who have sex with men practicing chemsex - a cross-sectional study in the Netherlands. *Preventive medicine reports*, *18*, 101074. doi:10.1016/j.pmedr.2020.101074.

Fernández-Dávila, P. (2016a). "Sesión de sexo, morbo y vicio": Una aproximación holística para entender la aparición del fenómeno ChemSex entre hombres gais, bisexuales y otros hombres que tienen sexo con hombres en España. *Revista Multidisciplinar del Sida*, *4*, 41-65.

Fernández-Dávila, P. (2016b, April). *"ChemSex in the sauna": An ethnographic study on the use of drugs in a gay sex venue in Barcelona*. Poster presented at the European ChemSex Forum, Londres.

Folch, C., Fernández-Dávila, P., Ferrer, L., Soriano, R., Díez, M. & Casabona, J. (2015). Alto consumo de drogas recreativas y conductas sexuales de riesgo en hombres que tienen relaciones sexuales con hombres. *Medicina Clínica*, *145*, 102-107. doi:10.1016/j.medcli.2014.04.030.

Frankis, J., Flowers, P., McDaid, L. & Bourne, A. (2018). Low levels of chemsex among men who have sex with men, but high levels of risk among men who engage in chemsex: Analysis of a cross-sectional online survey across four countries. *Sexual health*, *15*, 144–150. doi:10.1071/SH17159.

Gilbart, V. L., Simms, I., Jenkins, C., Furegato, M., Gobin, M., Oliver, I.,… Hughes, G. (2015). Sex, drugs and smart phone applications: Findings from semistructured interviews with men who have sex with men diagnosed with Shigella flexneri 3a in England and Wales. *Sexually transmitted infections*, *91*, 598–602. doi:10.1136/sextrans-2015-052014.

Glynn, R. W., Byrne, N., O'Dea, S., Shanley, A., Codd, M., Keenan, E.,… Clarke, S. (2018). Chemsex, risk behaviours and sexually transmitted infections among men who have sex with men in Dublin, Ireland. *International Journal of Drug Policy, 52,* 9-15. doi:10.1016/j.drugpo.2017.10.008.

Halkitis, P. N., Parsons, J. T. & Stirratt, M. J. (2001). A double epidemic: Crystal methamphetamine drug use in relation to HIV transmission among gay men. *Journal of homosexuality*, *41*, 17–35. doi:10.1300/J082v41n02_02.

Hammoud, M. A., Bourne, A., Maher, L., Jin, F., Haire, B., Lea, T.,… Prestage, G. (2018). Intensive sex partying with gamma-hydroxybutyrate: Factors associated with using gamma-hydroxybutyrate for chemsex among

Australian gay and bisexual men - results from the Flux Study. *Sexual health*, *15*, 123–134. doi:10.1071/SH17146.

Hegazi, A., Lee, M. J., Whittaker, W., Green, S., Simms, R., Cutts, R.,… Pakianathan, M. R. (2017). Chemsex and the city: Sexualised substance use in gay bisexual and other men who have sex with men attending sexual health clinics. *International journal of STD and AIDS*, *28*, 362–366. doi:10.1177/0956462416651229.

Hoornenborg, E., Coyer, L., van Laarhoven, A., Achterbergh, R., de Vries, H., Prins, M.,… Amsterdam PrEP Project team in the HIV Transmission Elimination Amsterdam Initiative. (2018). Change in sexual risk behaviour after 6 months of pre-exposure prophylaxis use: Results from the Amsterdam pre-exposure prophylaxis demonstration project. *AIDS*, *32*, 1527–1532. doi:10.1097/QAD.0000000000001874.

Íncera-Fernández, D., Gámez-Guadix, M. & Moreno-Guillén, S. (2021). Mental health symptoms associated with sexualized drug use (Chemsex) among men who have sex with men: A systematic review. *International journal of environmental research and public health*, *18*, 13299. doi:10.3390/ijerph182413299.

Krueger, R. A. & Casey, M. A. (2015*). Focus groups: A practical guide for applied research.* Londres: Sage.

Melendez-Torres, G. J., Hickson, F., Reid, D., Weatherburn, P. & Bonell, C. (2016). Nested event-level case-control study of drug use and sexual outcomes in multipartner encounters reported by men who have sex with men. *AIDS and behavior*, *20*, 646–654. doi:10.1007/s10461-015-1127-6.

Ministerio de Sanidad. (2020a). *Abordaje del fenómeno del chemsex.* Secretaría del Plan Nacional sobre el Sida. Ministerio de Sanidad. https://www.mscbs.gob.es/ciudadanos/enfLesiones/enfTransmisibles/sida/chemSex/docs/CHEMSEX._ABORDAJE.pdf.

Ministerio de Sanidad. (2020b). *Encuesta europea on-line para hombres que tienen sexo con hombres (EMIS-2017): Resultados en España.* https://www.mscbs.gob.es/ciudadanos/enfLesiones/enfTransmisibles/sida/docs/EMIS_Report_07052020.pdf.

Ottaway, Z., Finnerty, F., Amlani, A., Pinto-Sander, N., Szanyi, J. & Richardson, D. (2017). Men who have sex with men diagnosed with a sexually transmitted infection are significantly more likely to engage in sexualised drug use. *International journal of STD & AIDS*, *28*, 91–93. doi:10.1177/0956462416666753.

Pakianathan, M., Whittaker, W., Lee, M. J., Avery, J., Green, S., Nathan, B. & Hegazi, A. (2018). Chemsex and new HIV diagnosis in gay, bisexual and other men who have sex with men attending sexual health clinics. *HIV medicine*, *19*, 485-490. doi:10.1111/hiv.12629.

Petersson, F. J., Tikkanen, R. & Schmidt, A. J. (2016). Party and play in the closet? Exploring club drug use among Swedish men who have sex with men. *Substance use & misuse*, *51*, 1093–1103. doi:10.3109/10826084.2016.1160117.

Polit, D. F. & Beck, C. T. (2017). *Nursing Research. Generating and Assessing Evidence for Nursing Practice* (10th Ed). Londres: Wolters Kluwer.

Prestage, G., Hammoud, M., Jin, F., Degenhardt, L., Bourne, A. & Maher, L. (2018). Mental health, drug use and sexual risk behavior among gay and bisexual men. *The International journal on drug policy*, *55*, 169–179. doi:10.1016/j.drugpo.2018.01.020.

Public Health England. (2015). *Substance misuse services for men involved in Chemsex.* London: Public Health England. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/669676/Substance_misuse_services_for_men_who_have_sex_with_men_involved_in_chemsex.pdf.

Pufall, E. L., Kall, M., Shahmanesh, M., Nardone, A., Gilson, R., Delepech, V. & Ward., H. (2016, February). *Chemsex and high-risk sexual behaviours in HIVpositive men who have sex with men.* Communication presented at the Conference on Retroviruses and Opportunistic Infections, Boston.

Pufall, E. L., Kall, M., Shahmanesh, M., Nardone, A., Gilson, R., Delpech, V.,… Positive Voices study group (2018). Sexualized drug use ('chemsex') and high-risk sexual behaviours in HIV-positive men who have sex with men. *HIV medicine*, *19*, 261–270. doi:10.1111/hiv.12574.

Reback, C. J., Fletcher, J. B. & Swendeman, D. (2018). Associations between sociodemographic characteristics and sexual risk behaviors among methamphetamine-using men who have sex with men. *Substance use & misuse*, *53*, 1826–1833. doi:10.1080/10826084.2018.1436566.

Rogstad, K. (2016). Surveillance and sexually transmitted infections: A story of chemsex, tropical leg ulcers, gonococcal resistance and child abuse. *Current opinion in infectious diseases*, *29*, 39–40. doi:10.1097/QCO.0000000000000231.

Rosińska, M., Gios, L., Nöstlinger, C., Vanden Berghe, W., Marcus, U., Schink, S.,… Sialon II Network (2018). Prevalence of drug use during sex amongst MSM in Europe: Results from a multi-site bio-behavioural survey. *The International journal on drug policy*, *55*, 231–241. doi:10.1016/j.drugpo.2018.01.002.

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B.,… Jinks, C. (2018). Saturation in qualitative research: Exploring its conceptualization and operationalization. *Quality & Quantity*, *52*, 1893- 1907. doi:10.1007/s11135-017-0574-8.

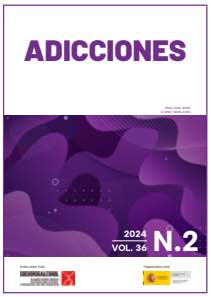
Soriano, R. (2017). El Chemsex y sus vínculos con el uso de aplicaciones de geolocalización entre hombres que tienen sexo con hombres en España: Un análisis etnográfico virtual. *Revista Multidisciplinar del Sida*, *5,* 8-20.

Weatherburn, P., Hickson, F., Reid, D., Torres-Rueda, S. & Bourne, A. (2017). Motivations and values associated with combining sex and illicit drugs ('chemsex') among gay men in South London: Findings from a qualitative study. *Sexually transmitted infections*, *93*, 203–206. doi:10.1136/sextrans-2016-052695.

Worth, H. & Rawstorne, P. (2005). Crystallizing the HIV epidemic: Methamphetamine, unsafe sex, and gay diseases of the will. *Archives of sexual behavior*, *34*, 483–486. doi:10.1007/s10508-005-6274-9.

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

ADICCIONES
2024 ■ VOL. 36 ■ N. 2 ■ PAGES 199–206
www.adicciones.es



ORIGINAL

Association between e-cigarette and conventional cigarette use among Spanish adolescents

Asociación entre el uso de cigarrillos electrónicos y cigarrillos convencionales en adolescentes españoles

Gema Aonso-Diego*, Roberto Secades-Villa*, Ángel García-Pérez*, **, Sara Weidberg*, José Ramón Fernández-Hermida*.

* Grupo de Conductas Adictivas (GCA). Facultad de Psicología. Universidad de Oviedo, España.
** Departamento de Psicología, Sociología y Filosofía. Universidad de León, España.

Abstract

In recent years, studies have highlighted the upward trend in electronic cigarette use among adolescents, as well as the potential of e-cigarette use to lead to subsequent conventional cigarette use. The study's aims were two-fold: 1) to examine the progression from e-cigarette use to conventional cigarette use; and 2) to analyze the differences in the severity of smoking pattern among dual users (i.e., e-cigarette and conventional cigarette use), cigarette-only smokers, and e-cigarette-only users in a Spanish adolescent population. Data were obtained from the ESTUDES, a representative survey of addictive behaviors of Spanish adolescents aged 14-18, which was comprised of 38,010 adolescents (M_{age} = 15.69; *SD* = 1.19; 51.35% females). Results indicate that lifetime e-cigarette use increased the prevalence of subsequent conventional cigarette use by 1.86 times (95% CI 1.74, 1.99), and the prevalence of conventional cigarette use in the last month by 2.38 times (95% CI 2.19, 2.58), independently of whether the e-cigarette contains nicotine or not. Dual users showed a higher percentage of daily smokers, and a greater number of cigarettes per day, a higher use of e-cigarettes with nicotine, and an earlier age of smoking onset. Regarding risk perception, e-cigarette-only users perceived both conventional tobacco and e-cigarettes as less harmful (all *p*-values < .001). These findings document the strength of association between e-cigarette and conventional cigarettes, and underscore the importance of developing legal restrictions and prevention strategies aimed at reducing e-cigarette use, which in turn would reduce tobacco use.

Keywords: e-cigarette, conventional cigarettes, nicotine, adolescents

Resumen

En los últimos años, algunos estudios han destacado la tendencia ascendente en el uso del cigarrillo electrónico entre adolescentes, así como el potencial para el posterior consumo de cigarrillos convencionales. Este estudio tuvo dos objetivos: 1) examinar la progresión del cigarrillo electrónico al cigarrillo convencional; y 2) analizar las diferencias en el patrón de gravedad del tabaquismo entre consumidores duales (i.e., cigarrillos electrónicos y convencionales), fumadores de cigarrillos y consumidores de cigarrillos electrónicos. Los datos se obtuvieron de la encuesta ESTUDES, una encuesta nacional que recoge información de conductas adictivas en adolescentes entre 14 y 18 años, la cual consta de 38 010 personas (M_{edad} = 15,69; *DT* = 1,19; 51,35% mujeres). Los resultados indicaron que haber usado alguna vez un cigarrillo electrónico incrementó la probabilidad de un consumo posterior de cigarrillos 1,86 veces (IC 95% 1,74-1,99), y la probabilidad de consumir tabaco en el último mes 2,38 veces (IC 95% 2,19-2,58), independientemente de si los cigarrillos electrónicos contienen o no nicotina. Los consumidores duales mostraron un mayor porcentaje de fumadores diarios, un mayor número de cigarrillos al día, un mayor uso de cigarrillos electrónicos con nicotina y una edad de inicio más temprana. Con respecto a la percepción de riesgo, los adolescentes que han usado solo cigarrillos electrónicos percibían tanto el tabaco como los cigarrillos electrónicos como menos dañinos (todos los valores *p* < ,001). Estos hallazgos indican la fuerte asociación entre los cigarrillos electrónicos y los convencionales, y subrayan la importancia de desarrollar restricciones legales y estrategias preventivas dirigidas al cigarrillo electrónico, lo que reduciría a su vez el consumo de tabaco.

Palabras clave: cigarrillo electrónico, cigarrillo convencional, nicotina, adolescentes

■ *Received: January 2022; Accepted: February 2023.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Ángel García-Pérez. Unidad Clínica de Conductas Adictivas. Facultad de Psicología, Universidad de Oviedo, Plaza Feijoo s/n, 33003, Oviedo, España.
E-mail: angap@unileon.es

The use of electronic nicotine delivery systems, including electronic cigarettes (e-cigarettes), has increased rapidly in recent years both among adults and adolescents (Cerrai, Potente, Gorini, Gallus & Molinaro, 2020; McNeill, Brose, Calder, Bauld & Robson, 2020; National Drugs Plan [PNSD], 2018; World Health Organization, 2020). This rise in prevalence of e-cigarette is also observed among Spanish adolescents, given that it has increased nearly three-fold in four years, from 17% in 2014 to 48.4% in 2018, surpassing the prevalence of conventional cigarette use (PNSD, 2018).

Previous studies have shown that e-cigarette use is associated with a significant increased risk of initiating conventional cigarette use among non-smoking adolescents and young adults (Baenziger, Ford, Yazidjoglou, Joshy & Banks, 2021; Chan et al., 2020; Chatterjee, Alzghoul, Innabi & Meena, 2018; Khouja, Suddell, Peters, Taylor & Munafò, 2021; Loukas, Marti & Harrell, 2022; Soneji et al., 2017). This finding was consistent when adjusting for several characteristics, including sociodemographic and tobacco-use-related variables (Bold et al., 2018; Hansen, Hanewinkel & Morgenstern, 2020). Results also indicate that adolescents who ever use e-cigarettes have between 2.44 and 10.93 times higher prevalence of future smoking initiation (Baenziger et al., 2021; Chan et al., 2020; Hair et al., 2021; Hansen et al., 2020; Khouja et al., 2021; O'Brien et al., 2021; Owotomo, Stritzel, McCabe, Boyd & Maslowsky, 2020; Soneji et al., 2017; Stanton et al., 2019), and that 30.7% - 44.4% of non-smokers who use e-cigarettes started using tobacco long-term, compared to 8.1% - 10.8% among non-users of e-cigarettes (Chatterjee et al., 2018; Martinelli et al., 2021).

Research supporting the association between e-cigarettes and conventional cigarettes have been based mainly on US population, with the almost absence of studies evaluating this pattern in other countries, including Spanish, where the regulatory context of e-cigarettes differs from other countries (Boletín Oficial del Estado, 2017), also from the European Union (European Union Tobacco Products Directive 2014/40/EU). The analysis of the association between e-cigarettes and conventional cigarettes accros different countries is particularly important because country-specific factors, such as legislation, taxation, social norms and public opinion, may affect this association (Khouja et al., 2021).

We sought to build on prior work by drawing on data from the Survey on Drug Use in Secondary Education (ESTUDES), a large nationally representative study of the Spanish adolescent population. The aims of this study were to: 1) examine the risk of progression to conventional cigarette use among adolescents with lifetime history of e-cigarette use; and 2) analyze the differences in the severity of smoking pattern among dual users (i.e., e-cigarette and cigarette smokers), cigarette-only smokers, and e-cigarette-only users. The indicators of severity of smoking pattern are characteristics (i.e., cigarettes per day, being daily smoker, age of smoking onset, and risk perception) associated with lower probability of intention to quit smoking, and of achieving smoking cessation, as well as, higher likelihood of being a smoker in adulthood (see e.g., Dai, 2021; Greenhalgh, Jenkins Stillman & Ford, 2016; Hamzeh et al., 2020; Hasin et al., 2013).

Method

Participants and procedure

The ESTUDES is based on a representative sample of adolescents aged from 14 to 18 years old in Spain. The survey is anonymous, self-administered and a paper-and-pencil assessment, and its duration was approximately 45-60 minutes. The participants were students enrolled in 3rd and 4th years of secondary education (i.e., 15 and 16 years old), 1st and 2nd years of baccalaureate level (i.e., 17 and 18 years old), or 1st and 2nd years of basic and intermediate vocational training. Details on ESTUDES survey methodology and procedures are available elsewhere (PNSD, 2018).

The total sample was comprised of 38,010 adolescents (M_{age} = 15.69; *SD* = 1.188; 51.35% females). A total of 52.90% of participants were enrolled in secondary education, 35.51% in baccalaureate and the remaining 11.58% in vocational training. The sample was taken from 917 educational centers (68.44% public schools), and 1,769 classrooms, representative of the entire national territory.

Measures

Information relative to participants was collected retrospectively. Specifically, adolescents completed the survey that included sociodemographic measures on age, sex and academic year. Additionally, they were asked about the pattern of use of both conventional cigarettes and e-cigarettes. Specifically, students were asked about their lifetime, last month and daily use of conventional cigarette, as well as the age of smoking onset and the number of cigarettes smoked per day. Regarding e-cigarette use, participants were asked about the use in their lifetime, the age of e-cigarette use onset, and if the e-cigarette cartridges contain or not nicotine.

Also, risk perception of smoking 20 cigarettes per day, and of using e-cigarette sometimes was collected. Responses were coded in two categories, "few or no problems" and "quite a few or several problems".

Data analysis

In order to examine the relationship between e-cigarette use (both with and without nicotine) and tobacco use, several binary regression models were conducted. Prevalence ratio (PR) and its confidence intervals at 95% were calculated following prior recommendations (Espelt, Bosque-Prous & Marí-Dell'Olmo, 2019). The analyses were

adjusted by participants' sociodemographic characteristics, specifically sex and age.

Differences in the severity of smoking pattern among dual users (i.e., both e-cigarette and conventional cigarette smokers), conventional cigarettes-only smokers, and e-cigarette-only users were analyzed using ANOVA for continuous variables (i.e., cigarettes per day and age of smoking onset) and chi-square in categorical variable (i.e., daily smokers, type of e-cigarette cartridges, and risk perception). Effect size was calculated using Cohen's *d*, phi coefficient, and Cramer's V, as appropriate.

All analyses were conducted using the statistical package SPSS for Windows (version 24, SPSS, Inc., Chicago, IL, USA), with 95% of confidence interval.

Results

Risk of progression from e-cigarette use to conventional cigarette use

A total of 45.79% (n = 4,533) of dual users (i.e., those who used both e-cigarettes and conventional cigarettes in their lifetime) smoked conventional cigarettes firstly and subsequently e-cigarettes, 19.70% (n = 1,950) used e-cigarettes before and cigarettes later, and the remaining 34.50% (n = 3,415) started at the same age in both.

Results indicated that 25.08% (n = 1,950) of lifetime e-cigarette users progressed to conventional cigarette use, compared to 17.47% (n = 3,616) of non-e-cigarette users that later smoked. E-cigarette use increased 1.48 times the prevalence of subsequent lifetime conventional cigarette use, as well as 2.21 times the prevalence of last month conventional cigarette use (see Table 1).

Considering only those adolescents who initially used e-cigarettes, the 18.80% (n = 1,356) used e-cigarettes with nicotine, and 81.19% (n = 5,826) without nicotine. Using e-cigarettes with nicotine increased 2.64 times the prevalence of being a lifetime cigarette smoker (4.54 times subsequent last month cigarette use), whereas using e-cigarettes without nicotine increased 1.22 times the prevalence of later smoking (1.73 times subsequent last month cigarette use) (see Table 1).

Differences in the severity of smoking pattern among dual users, cigarette-only smokers, and e-cigarette-only users

Participants who have ever smoked both e-cigarettes and conventional cigarettes are mostly daily smokers, smoke a greater number of cigarettes per day, mostly use e-cigarettes with nicotine, and initiated smoking –either e-cigarette or conventional cigarette– almost a year earlier. Regarding with risk perception, e-cigarettes-only users perceived both tobacco and e-cigarette as less harmful, compared to cigarette-only smokers and dual users (see Table 2).

Discussion

This is the first study examining the relationship between e-cigarette use and conventional cigarette use among a nationally representative sample of Spanish adolescents. The main outcomes underline that the use of e-cigarettes increased by 48% the prevalence of progression to lifetime conventional cigarette use, and by 121% the prevalence of progression to last month conventional cigarette use, independently of whether the e-cigarette contains nicotine or not. Further, dual users (i.e., e-cigarettes and conventional cigarettes) were mostly daily smokers, smoke a greater number of cigarettes per day, use mostly e-cigarettes with nicotine, and initiate smoking –either e-cigarettes or conventional cigarettes– almost a year earlier. Conversely, e-cigarette-only users showed a lower risk perception from tobacco and e-cigarettes.

These findings are in agreement with previous research (see e.g., Baenziger et al., 2021; Chadi, Hadland & Harris, 2019; Chan et al., 2020; Epstein et al., 2021; Hair et al., 2021; Hansen et al., 2020; Khouja et al., 2021; Owotomo et al., 2020; Soneji et al., 2017; Stanton et al., 2019; Walley, Wilson, Winickoff & Groner, 2019), which evidences that e-cigarette use significantly increases the probability of progression to conventional cigarette use among non-smokers. Several complementary reasons from the biochemical, behavioral and environmental aspects may contribute to explain this progression. Regular e-cigarette use with nicotine content leads to a nicotine

Table 1
Relationship between e-cigarette and subsequent conventional cigarette use adjusted by participants' sex and age

	Subsequent lifetime cigarette use	Subsequent last month cigarette use
E-cigarette use[a]	1,950 (7,774)	1,216 (8,230)
No e-cigarette use[a]	3,616 (20,689)	1,615 (20,497)
	RP = 1.48 (IC 95% 1.41, 1.55)	*RP* = 2.21 (IC 95% 2.06, 2.37)
E-cigarette with nicotine[a]	735 (1,356)	522 (1,443)
No e-cigarette use[a]	3,616 (20,689)	1,615 (20,497)
	RP = 2.64 (IC 95% 2.50, 2.79)	*RP* = 4.54 (IC 95% 4.20, 4.91)
E-cigarette without nicotine[a]	1,124 (5,826)	646 (6,114)
No e-cigarette use[a]	3,616 (20,689)	1,615 (20,497)
	RP = 1.22 (IC 95% 1.15, 1.29)	*RP* = 1.73 (IC 95% 1.59, 1.88)

Note. [a]frequency (total); PR = prevalence ratio; CI = confidence interval.

Table 2
Differences between dual users, cigarette-only users, and e-cigarettes-only users

	Dual users[b] (*n* = 11,226)	Cigarette-only users (*n* = 3,616)	E-cigarettes-only users (*n* = 5,824)	*p*-value	Effect size
Daily smokers	2,738 (24.38%)	416 (11.50%)	-	< .001	.31
Age of smoking onsetac	13.77 (1.61)	14.69 (1.48)	14.45 (1.34)	< .001	.51
Cigarettes per daya	5.96 (5.14)	4.97 (4.65)	-	< .001	.01
Type of e-cigarette cartridge (with nicotine)	4,315 (38.43%)	-	621 (10.66%)	< .001	.31
Risk perception of e-cigarette use (several health problems)	1,143 (10.18%)	497 (13.74%)	467 (8.02%)	< .001	.09
Risk perception of cigarette use (several health problems)	9,315 (82.98%)	3,116 (86.17%)	4,748 (81.52%)	< .001	.05

Note. [a]Mean (standard deviation). [b]Dual users refers to those participants who ever use e-cigarettes and conventional cigarettes. cSmoking refers to either e-cigarette use or conventional cigarette use.

dependence (Case et al., 2018; Hammond et al., 2021), and smokers switch to tobacco in order to obtain nicotine more immediately (Grana, Benowitz & Glantz, 2014; O'Connell et al., 2019). The fact that even e-cigarettes without nicotine increased subsequent cigarette use can be explained because both share the same mimetic, that is, hand-to-mouth movements, puffing and exhaling smoke (Caponnetto et al., 2013, 2017; Park et al., 2020).

The second finding was that adolescents who ever used both e-cigarettes and conventional cigarettes showed greater severity of smoking pattern than adolescents who only used conventional cigarettes or e-cigarettes. These outcomes are aligned with previous research, which consistently shows that dual users have a more prevalent daily use (Conner et al., 2019), smoke more cigarettes per day (Wang et al., 2018), use mostly e-cigarette with nicotine cartridges (Dai, 2021), and engage earlier in smoking behavior (Conner et al., 2021). This smoking pattern could be explained by several reasons. Dual users tend to greater nicotine dependence (Shiffman & Sembower, 2020), and e-cigarette use provides less nicotine compared to conventional cigarettes (Grana et al., 2014), resulting in more daily smokers and in a greater number of cigarettes per day. Finally, as with other substances, earlier drug use is a strong predictor of more severe use (Pilatti, Read & Pautassi, 2017), as our results show.

Taken together, these results suggest a strength of association between e-cigarettes and conventional cigarettes. One potential policy implication is that legal changes and preventive strategies that target e-cigarette use may be effective in reducing conventional tobacco use among adolescents. Our findings, therefore, highlight the need to enact regulation policies that reduce the availability of e-cigarettes in Spain, such as the prohibition of flavors in refillable cartridges, the equalization of taxes on all tobacco products, the prohibition of consumption in enclosed or semi-enclosed public places, and the regulation of the advertising, promotion and sponsorship. Our findings also underscore the importance of developing prevention and treatment strategies directed at curtailing e-cigarette use in this population.

Our study is not exempt of limitations common to most large-scale surveys. First, although studies of retrospective nature are appropriate for this type of analysis, a prospective study would be more robust to confirm the current findings. Second, we focused on adolescents who started using e-cigarettes before using conventional cigarettes or vice versa, so it may not be possible to generalize our results to those who start using conventional cigarettes and e-cigarettes at the same age. Third, the type of e-cigarette used by adolescents (e.g., heated tobacco products), as well as the frequency of vaping was not specified. Finally, those adolescents who were not schooled were not included in the survey, thus, these findings cannot be extrapolated to all Spanish adolescents aged 14-18.

Despite these limitations, our study extends previous findings by documenting for the first time in a representative sample of Spanish adolescents, that e-cigarette use is related to an increased risk of subsequent conventional cigarette use, regardless of whether cartridges contain nicotine or not. Also, dual users showed greater severity of smoking pattern, evidenced by a higher number of daily smokers, cigarettes per day, a greater use of e-cigarettes with nicotine, and lower age of smoking onset. There is a need to consider the health benefits of changes in e-cigarette regulation that reduce access to these devices, and the development of prevention and intervention efforts targeted at adolescent e-cigarette users.

Role of Funding Sources

This research was supported by a Predoctoral Grant from the National Agency of Research of the Spanish Ministry of Science, Innovation and Universities (FPU17/00659). Spanish Ministry of Science, Innovation and Universities had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

Contributors

GAD: conceptualization, formal analysis, methodology, writing-original draft. RSV: conceptualization, writing original draft. AGP: conceptualization, formal analysis, methodology. SW: editing, writing-review, supervision. JRFH: writing-review, supervision.

Conflict of interests

None declared.

Acknowledgements

The authors thank the Spanish National Drug Plan (Ministry of Health, Social Services and Equality) for providing the survey data.

References

Baenziger, O. N., Ford, L., Yazidjoglou, A., Joshy, G. & Banks, E. (2021). E-cigarette use and combustible tobacco cigarette smoking uptake among non-smokers, including relapse in former smokers: Umbrella review, systematic review and meta-analysis. *BMJ Open*, *11*, 1–11. doi:10.1136/bmjopen-2020-045603.

Bold, K. W., Kong, G., Camenga, D. R., Simon, P., Cavallo, D. A., Morean, M. E. & Krishnan-Sarin, S. (2018). Trajectories of e-cigarette and conventional cigarette use among youth. *Pediatrics*, *141*. doi:10.1542/peds.2017-1832.

Boletin Oficial del Estado (2017). *Real Decreto 579/2017, por el que se regulan determinados aspectos relativos a la fabricación, presentación y comercialización de los productos del tabaco y los productos relacionados.* https://www.boe.es/boe/dias/2017/06/10/pdfs/BOE-A-2017-6585.pdf.

Caponnetto, P., Maglia, M., Cannella, M. C., Inguscio, L., Buonocore, M., Scoglio, C.,… Vinci, V. (2017). Impact of different e-cigarette generation and models on cognitive performances, craving and gesture: A randomized cross-over trial (CogEcig). *Frontiers in Psychology*, *8*, 127. doi:10.3389/fpsyg.2017.00127.

Caponnetto, P., Russo, C., Bruno, C. M., Alamo, A., Amaradio, M. D. & Polosa, R. (2013). Electronic cigarette: A possible substitute for cigarette dependence. *Monaldi Archives for Chest Disease - Pulmonary Series*, *79*, 12–19. doi:10.4081/monaldi.2013.104.

Case, K. R., Mantey, D. S., Creamer, M. L. R., Harrell, M. B., Kelder, S. H. & Perry, C. L. (2018). E-cigarette-specific symptoms of nicotine dependence among Texas adolescents. *Addictive Behaviors*, *84*, 57–61. doi:10.1016/j.addbeh.2018.03.032.

Cerrai, S., Potente, R., Gorini, G., Gallus, S. & Molinaro, S. (2020). What is the face of new nicotine users? 2012–2018 e-cigarettes and tobacco use among young students in Italy. *International Journal of Drug Policy*, *86*, 102941. doi:10.1016/j.drugpo.2020.102941.

Chadi, N., Hadland, S. E. & Harris, S. K. (2019). Understanding the implications of the "vaping epidemic" among adolescents and young adults: A call for action. *Substance Abuse*, *40*, 7–10. doi:10.1080/08897077.2019.1580241.

Chan, G. C. K., Stjepanović, D., Lim, C., Sun, T., Shanmuga Anandan, A., Connor, J. P.,… Leung, J. (2020). Gateway or common liability? A systematic review and meta-analysis of studies of adolescent e-cigarette use and future smoking initiation. *Addiction*, *116*, 743–756. doi:10.1111/add.15246.

Chatterjee, K., Alzghoul, B., Innabi, A. & Meena, N. (2018). Is vaping a gateway to smoking: A review of the longitudinal studies. *International Journal of Adolescent Medicine and Health*, *30*. doi:10.1515/ijamh-2016-0033.

Conner, M., Grogan, S., Simms-Ellis, R., Cowap, L., Armitage, C. J., West, R.,… Siddiqi, K. (2021). Association between age at first reported e-cigarette use and subsequent regular e-cigarette, ever cigarette and regular cigarette use. *Addiction, 116,* 1839-1847.doi:10.1111/add.15386.

Conner, M., Grogan, S., Simms-Ellis, R., Scholtens, K., Sykes-Muskett, B., Cowap, L.,… Siddiqi, K. (2019). Patterns and predictors of e-cigarette, cigarette and dual use uptake in UK adolescents: Evidence from a 24-month prospective study. *Addiction*, *114*, 2048–2055. doi:10.1111/add.14723.

Dai, H. (2021). Prevalence and factors associated with youth vaping cessation intention and quit attempts. *Pediatrics, 148*, e2021050164. doi:10.1542/peds.2021-05016.

Epstein, M., Bailey, J. A., Kosterman, R., Rhew, I. C., Furlong, M., Oesterle, S. & McCabe, S. E. (2021). E-cigarette use is associated with subsequent cigarette use among young adult non-smokers, over and above a range of antecedent risk factors: A propensity score analysis. *Addiction*, *116*, 1224–1232. doi:10.1111/add.15317.

Espelt, A., Bosque-Prous, M. & Marí-Dell'Olmo, M. (2019). Considerations on the use of odds ratio versus prevalence or proportion ratio. *Adicciones, 31*, 257-259. doi:10.20882/adicciones.1416.

European Union Tobacco Products Directive 2014/40/EU. *European Parliament and Council, on the approximation of*

the laws, regulations and administrative provisions of the Member States concerning the manufacture, presentation and sale of tobacco and related products and repealing Directive 2001/37/EC. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0040.

Grana, R., Benowitz, N. & Glantz, S. A. (2014). E-cigarettes: A scientific review. *Circulation, 129*, 1927-86. doi:10.1161/CIRCULATIONAHA.114.007667.

Greenhalgh, E. M., Jenkins S., Stillman, S. & Ford, C. (2016). *Factors that predict success or failure in quit attempts*. In Greenhalgh, EM, Scollo, MM and Winstanley, MH (Ed.). Tobacco in Australia: Facts and issues. Cancer Council Victoria.

Hair, E. C., Kreslake, J. M., Mowery, P., Pitzer, L., Schillo, B. & Vallone, D. M. (2021). A longitudinal analysis of e-cigarette use and cigar, little cigar or cigarillo initiation among youth and youth adults: 2017-2019. *Drug and Alcohol Dependence, 226,* 108821. doi:10.1016/j.drugalcdep.2021.108821.

Hammond, D., Reid, J. L., Burkhalter, R., O'Connor, R. J., Goniewicz, M. L., Wackowski, O. A.,… Hitchman, S. C. (2021). Trends in e-cigarette brands, devices and the nicotine profile of products used by youth in England, Canada and the USA: 2017–2019. *Tobacco Control, 32,* 19-29. doi:10.1136/tobaccocontrol-2020-056371.

Hamzeh, B., Farnia, V., Moradinazar, M., Pasdar, Y., Shakiba, E., Najafi, F. & Alikhani, M. (2020). Pattern of cigarette smoking: Intensity, cessation, and age of beginning: Evidence from a cohort study in West of Iran. *Substance abuse treatment, prevention, and policy, 15*, 1-9. doi:10.1186/s13011-020-00324-z.

Hansen, J., Hanewinkel, R. & Morgenstern, M. (2020). Electronic cigarette advertising and teen smoking initiation. *Addictive Behaviors*, *103*, 106243. doi:10.1016/j.addbeh.2019.106243.

Hasin, D. S., O'Brien, C. P., Auriacombe, M., Borges, G., Bucholz, K., Budney, A.,… Grant, B. F. (2013). DSM-5 criteria for substance use disorders: Recommendations and rationale. *The American journal of psychiatry, 170*, 834–851. doi:10.1176/appi.ajp.2013.12060782.

Khouja, J. N., Suddell, S. F., Peters, S. E., Taylor, A. E. & Munafò, M. R. (2021). Is e-cigarette use in non-smoking young adults associated with later smoking? A systematic review and meta-analysis. *Tobacco Control*, *30*, 8–15. doi:10.1136/tobaccocontrol-2019-055433.

Loukas, A., Marti, C. N. & Harrell, M. B. (2022). Electronic nicotine delivery systems use predicts transitions in cigarette smoking among young adults. *Drug and Alcohol Dependence, 231*, 109251. doi:10.1016/j.drugalcdep.2021.109251.

Martinelli, T. F., Candel, M., de Vries, H., Talhout, R., Knapen, V., Croes, E.,… Nagelhout, G. E. (2021). Exploring the gateway hypothesis of e-cigarettes and tobacco a prospective replication study among adolescents in the Netherlands and Flanders. *Tobacco Control*, 1–9. doi:10.1136/tobaccocontrol-2021-056528.

McNeill, A., Brose, L., Calder, R., Bauld, L. & Robson, D. (2020). *Vaping in England: An evidence update including mental health and pregnancy, March 2020. London: Public Health England.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/869401/Vaping_in_England_evidence_update_March_2020.pdf.

National Drugs Plan (PNSD) (2018). *Encuesta sobre el uso de drogas en enseñanzas secundarias en España (ESTUDES) 1994-2018/2019.* https://pnsd.sanidad.gob.es/profesionales/sistemasInformacion/sistemaInformacion/pdf/ESTUDES_2020_Informe.pdf.

O'Brien, D., Long, J., Quigley, J., Lee, C., McCarthy, A. & Kavanagh, P. (2021). Association between electronic cigarette use and tobacco cigarette smoking initiation in adolescents: A systematic review and meta-analysis. *BMC Public Health*, *21*, 954. doi:10.1186/s12889-021-10935-1.

O'Connell, G., Pritchard, J. D., Prue, C., Thompson, J., Verron, T., Graff, D. & Walele, T. (2019). A randomised, open-label, cross-over clinical study to evaluate the pharmacokinetic profiles of cigarettes and e-cigarettes with nicotine salt formulations in US adult smokers. *Internal and Emergency Medicine*, *14*, 853–861. doi:10.1007/s11739-019-02025-3.

Owotomo, O., Stritzel, H., McCabe, S. E., Boyd, C. J. & Maslowsky, J. (2020). Smoking intention and progression from e-cigarettes use to cigarette smoking. *Pediatrics*, *146*, e2020002881. doi:10.1542/peds.2020-002881.

Park, E., Livingston, J. A., Wang, W., Kwon, M., Eiden, R. D. & Chang, Y. P. (2020). Adolescent E-cigarette use trajectories and subsequent alcohol and marijuana use. *Addictive Behaviors*, *103*. doi:10.1016/j.addbeh.2019.106213.

Pilatti, A., Read, J. P. & Pautassi, R. M. (2017). ELSA 2016 cohort: Alcohol, tobacco, and marijuana use and their association with age of drug use onset, risk perception, and social norms in Argentinean college freshmen. *Frontiers in Psychology*, *8*, 1452. doi:10.3389/fpsyg.2017.01452.

Shiffman, S. & Sembower, M. A. (2020). Dependence on e-cigarettes and cigarettes in a cross-sectional study of US adults. *Addiction*, *115*, 1924–1931. doi:10.1111/add.15060.

Soneji, S., Barrington-Trimis, J. L., Wills, T. A., Leventhal, A. M., Unger, J. B., Gibson, L. A.,… Sargent, J. D. (2017). Association between initial use of e-cigarettes and subsequent cigarette smoking among adolescents and young adults a systematic review and meta-analysis. *JAMA Pediatrics*, *171*, 788–797. doi:10.1001/jamapediatrics.2017.1488.

Stanton, C. A., Bansal-Travers, M., Johnson, A. L., Sharma, E., Katz, L., Ambrose, B. K.,… Pearson, J. L. (2019). Longitudinal e-cigarettes and cigarette use among US

youth in the PATH study (2013-2015). *Journal of the National Cancer Institute*, *111*, 1088–1096. doi:10.1093/jnci/djz006.

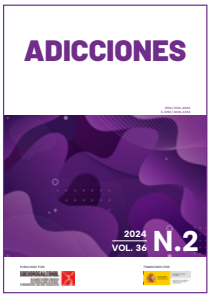
Walley, S. C., Wilson, K. M., Winickoff, J. P. & Groner, J. (2019). A public health crisis: Electronic cigarettes, vape, and JUUL. *Pediatrics*, *143*, e20182741. doi:10.1542/peds.2018-2741.

Wang, J. B., Olgin, J. E., Nah, G., Vittinghoff, E., Cataldo, J. K., Pletcher, M. J. & Marcus, G. M. (2018). Cigarette and e-cigarette dual use and risk of cardiopulmonary symptoms in the Health eHeart Study. *PLoS ONE*, *13*. doi:10.1371/journal.pone.0198681.

World Health Organization (2020). *Summary results of the global youth tobacco survey in selected countries of the WHO European Region*. https://apps.who.int/iris/bitstream/handle/10665/336752/WHO-EURO-2020-1513-41263-56157-eng.pdf?sequence=1&isAllowed.

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

ADICCIONES
2024 ■ VOL. 36 ■ N. 2 ■ PAGES 207–216
www.adicciones.es



ORIGINAL

Mortality in patients addicted to opioids across 30-year follow-up

Mortalidad entre los pacientes adictos a opiáceos al cabo de 30 años de seguimiento

Andrés Fontenla*, Antonio Vaamonde**, Gerardo Flórez***.

* Unidad Asistencial Drogodependencias de Cangas, Complejo Hospitalario Universitario de Vigo, España.
** Departamento de Estadística e Investigación Operativa de la Universidad de Vigo, España.
*** Unidad de Conductas Adictivas, Complejo Hospitalario Universitario de Orense, España.

Abstract

The maintenance of premature mortality among opioid users is a highly significant public health issue. The main objective is to study the causes and age of mortality recorded in the population of opiate addicts (n = 1,998) treated at the Cangas Drug Addiction Assistance Unit (Pontevedra) over more than 30 years. The causes of mortality are classified into 4 groups: overdose, disease, suicide and trauma. The average age of mortality of the patients is compared with that of the general population residing in the same health area. Throughout the study, the premature mortality of these patients remained high, although with a tendency to decrease over time: up to 1998, the mean age of death was 31.8 years compared to 47.7 years since 1998. The mean age of death was always lower than that of the general population. Disease is the most prevalent cause of mortality (84% of the deceased) with a great difference compared to the other 3 groups. Despite the reduction in infections associated with parenteral use, there are still factors associated with an unhealthy lifestyle that, together with the aging of this population, explain to a large extent why the average age of death of these patients is not equal to that of the general population, which seems to force us to review the objectives of health and social intervention.

Keywords: opioid addiction, premature mortality, age, disease, overdose

Resumen

El mantenimiento de la mortalidad prematura entre los consumidores de opiáceos es una cuestión de salud pública altamente significativa. El objetivo principal es estudiar las causas y edad de mortalidad registradas en la población de adictos a opiáceos (n = 1.998) atendida en la Unidad Asistencial de Drogodependencias de Cangas (Pontevedra) a lo largo de más de 30 años. Las causas de mortalidad se clasifican en 4 grupos: sobredosis, enfermedades, suicidio y trauma. La edad media de mortalidad de los pacientes se compara con la de la población general que reside en la misma área sanitaria. A lo largo del estudio la mortalidad prematura de estos pacientes se mantiene elevada, aunque con tendencia a disminuir con el paso del tiempo: hasta 1998, 31,8 años de edad media de fallecimiento frente a 47,7 años desde 1998. La edad media de fallecimiento siempre es inferior a la de la población general. La enfermedad es la causa de mortalidad más prevalente (84% de los fallecidos) con gran diferencia frente a los otros 3 grupos. Pese a la reducción de las infecciones asociadas al consumo por vía parenteral, persisten factores asociados a un estilo de vida poco saludable, que, unidos al envejecimiento de esta población, explican en buena medida que la edad media de fallecimiento de estos pacientes no se equipare a la de la población general, lo que parece obligar a revisar los objetivos de la intervención sanitaria y social.

Palabras clave: adicción a opiáceos, mortalidad prematura, edad, enfermedad, sobredosis

■ *Received: February 2022; Accepted: October 2022.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Gerardo Flórez. Unidad de Conductas Adictivas, Hospital Santa María Nai, Complejo Hospitalario Universitario de Orense, Ramón Puga 52-56, 32005, Orense, España. Email: gerardof9672@gmail.com

According to data supplied to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) by the Spanish Government Delegation for the National Plan on Drugs (DGPNSD), "the age-standardized mortality rate among users of cocaine and heroin, or only cocaine, is higher than that of the general population", and "the mortality rate induced by illegal drugs among adults (15 to 64 years) was 12.7 deaths per million in 2015, a figure lower than the average estimates in Europe, which was around 21.8 deaths per million" (EMCDDA, 2020).

In 2018 it was estimated that a heroin user in Europe had between 5-10 times more chances of dying than non-users of the same age and sex (EMCDDA, 2020). The average age of death was 42 years, heroin was involved in 78% of the deaths, and 8,300 deaths were recorded due to overdose, mainly of morphine derivatives. Of the deceased, 76% were male (EMCDDA, 2020).

Four groups of death causes can be considered in these patients: 1. overdose, 2. diseases, 3. suicide, 4. trauma (EMCDDA, 2020; Larney et al., 2020). Overdose has been considered both the most direct and the most frequent cause of death in these patients (Degenhardt et al., 2011; Onyeka et al., 2014; Onyeka et al., 2015). Other, more indirect causes such as suicide and trauma, related to intoxication and social and psychological deterioration derived from chronic use, result in 20-40% of deaths. Finally, less than 10% of deaths in the sample were caused by infectious diseases such as human immunodeficiency virus (HIV). Harm reduction measures, less intravenous use, and treatments for HIV and, more recently, for the hepatitis C virus (HCV) have reduced mortality from these infectious diseases (Giraudon, Vicente, Matias, Mounteney & Griffiths, 2012). However, not all studies agree with these prevalence rates, and some point to diseases as a whole, not just those of an infectious nature, as the most frequent cause of death in these patients (Bahji, Cheng, Gray & Stuart, 2020; Cruts, Buster, Vicente, Deerenberg & Van Laar, 2008).

Analyzed as a whole, it must be concluded that it is difficult to know the exact mortality data of these patients, since the different data collection methods regarding cause of death in the different countries and studies, together with the different designs used in the studies, are confounding factors which are difficult to surmount when research and data collection are not homogenized (Bahji, Cheng, Gray & Stuart, 2019; Bahji et al., 2020; Cruts et al., 2008; Degenhardt et al., 2011; Degenhardt, Hall & Warner-Smith, 2006; Dennis, 2021; Giraudon et al., 2012; Horon, Singal, Fowler & Sharfstein, 2018; Larney et al., 2020; Mathers & Degenhardt, 2014; Mathers et al., 2013; Molist et al., 2018; Onyeka et al., 2014; Onyeka et al., 2015; Slavova et al., 2019).

With regard to overdose, which is the main directly use-related cause of death in these patients, it is well known that heroin is the substance most closely linked to it (Horon, Singal, Fowler & Sharfstein, 2018; Martins, Sampson, Cerdá & Galea, 2015; Onyeka et al., 2015). However, since polydrug use is common among these patients, other substances such as alcohol, cocaine, cannabis and benzodiazepines are also involved in overdoses. The COPSIAD study may be taken as an example (Pereiro, Pino, Flórez, Arrojo & Becoña, 2013), carried out in the same healthcare setting as the present study. Carried out in the addiction treatment network of Galicia in 2010, this study showed that 63.9% of the 2,300 participants were polydrug users. In patients whose main substance of abuse was heroin, this figure increased to 79.1% (Pereiro et al., 2013). The risk of suicide attempts and trauma resulting from moments of intoxication were also increased by such polydrug use (Park et al., 2020).

Trauma is not only linked to intoxication, with the severity and hardship typical of social exclusion situations in which these patients find themselves also contributing to this type of mortality (EMCDDA, 2020; Larney et al., 2020).

With regard to suicide, the use of substances multiplies the risk of this type of death compared to the general population by 15. Comorbidity with depression markedly increases suicide risk in the addicted population (Bahji et al., 2020; Carrasco-Barrios et al., 2020; Larney et al., 2020).

Other causes of death that should also be taken into account, especially as these patients age, are cardiovascular disease, lung disease, and cancer. Although these diseases are also common in the general population as people age, addicted patients take less care of their health and smoke more, raising the likelihood of suffering from these diseases and dying prematurely as a result (Giraudon et al., 2012; Molist et al., 2018; Morris and Garver-Apgar, 2020; Pajusco et al., 2012).

It is therefore of special interest to study how mortality figures in opioid-using patients change in the long term so that design better intervention and prevention strategies to improve the survival expectancy of these patients may be designed (Colom et al., 2021; Hickman et al., 2018; Ma et al., 2019).

The objectives of this study are:

1. To calculate the mortality rates of the population of opioid users treated in a drug addiction care unit (DACU) from 1986 to 2020.
2. To compare the mortality rates of this DACU with those of the general population of the same geographic area (Pontevedra province).
3. To assess the attributed causes of mortality, divided into 4 groups of causes, according to the EMCDDA protocols (EMCDDA, 2020).
4. Link mortality in these patients to HIV/HCV infections.

The working hypothesis is as follows: Patients who use opioids will have a higher and premature mortality rate compared to that of the general population. The causes of death in these patients will remain stable over time, with the exception of diseases; in this last cause, the development of treatments for HIV and HCV will reduce mortality and delay the age of death.

Material and methods

Participants

Patients using opioids, confirmed through urinalysis, and treated at the Cangas Drug Addiction Care Unit (Pontevedra), from when it opened in 1986 until 2020.

The total population attended over this period was 1,988 patients (1,611 men, 377 women).

Procedure

Longitudinal study of all opioid-using patients who began treatment at the Cangas Drug Addiction Care Unit during the study period.

Assessment

The registered personal medical records in the care unit's own physical registry were used, supplemented by the electronic medical records of the health service of Galicia (IANUS). One of the authors (A.F.), in the capacity of the unit's medical professional, reviewed and collated the variables assessed in both registries to gather all the variables included in the study. This procedure was carried out on an annual basis.

The following variables were collected from all study participants:

- *Sociodemographic*: 1. sex; 2. date of birth and age.
- *Clinical*: 1. Use of opioids; 2. HIV serology; 3. HCV serology.

In addition, in all registered deaths (149) the cause of death and its date were determined, grouping them as follows: 1. Overdose, 2. Diseases, 3. Suicide or 4. Trauma.

Statistical analysis

The R package was used to analyze and verify the survival data of the studied population with the following statistical significance tests:

- The classic Kaplan-Meier method for constructing survival tables and their graphical expression, survival curves.
- Wilcoxon's non-parametric test, which makes it possible to establish whether or not a quantitative variable, such as the age of death, depends significantly on a qualitative factor with 2 levels.
- Cox regression (as a proportional hazards model), which allows the statistical significance of the effect of a factor on the survival curve to be established, and also calculates a measure of the effect in terms of relative risk.
- The Harrington-Fleming test, with the same purpose as the Cox regression of deciding whether or not the effect is significant, and being a general test, it has no additional requirements.

Death rates in each period were compared with each other over time. As an additional comparison method, the rate of deaths in the general population of the province of Pontevedra in the year 2020 was added, calculated from a random sample with the same n as the patient sample, according to the National Institute of Statistics (INE) (www.ines.es), and with the mortality rate in the general population taken as the gold standard.

The statistical significance criterion in all tests was $p < 0.05$, established as the maximum acceptable value for the probability of a type I error.

Results

The total population attended during the study period was 1,988 patients (1,611 men, 377 women, in a male/female ratio of 4/1 that remained stable throughout). This data reflects a similar proportion of the numbers of patients treated to the figures reported in European surveys (EMCDDA, 2020).

For the purposes of comparison, in 2020, 374 patients were treated (321 men and 73 women, 227 of which were in methadone maintenance programs and 10 in treatment with bupremorphine/naloxone), and polydrug substance use (alcohol, cocaine, cannabis and tobacco) was observed to be common practice (Pereiro et al., 2013).

Of the total number of deceased patients (149) registered in the medical records, the number of deceased men (127) is higher than that of women (Morris & Garver-Apgar, 2020); this proportion (85% men deceased, 15% women deceased) is slightly higher than that of the patients attended in the unit (81% men, 19% women) during the period of time studied, with no significant differences observed in the mean age between both sexes.

Disease caused the death of 125 patients (83.89%), 6 died due to overdose (4.02%), 5 due to suicide (3.35%), 8 died in accidents (5.36%) and 4 from unidentified causes (2.68%); the latter were excluded from the analysis.

Of the deceased patients, 57 (38.25%) were HIV positive and 103 (69.12%) were HCV positive.

1. Survival analysis by mortality cause

Given that most of the patients died as a result of disease, the survival analysis by cause of mortality was carried out following two different strategies. First, data on death by disease was compared to the other three groups together. Subsequently, the four causes were studied separately.

Disease versus other causes

The survival curves (Figure 1) following the classic Kaplan-Meier method overlap, indicating that the other causes (overdose, accident, suicide) did not present an age of death significantly lower or different from that corresponding to the majority group of deaths from disease. It must be remembered that the median age of death was practically the same (disease at 41 years, other causes at 40 years).

The Wilcoxon test (P value = 0.5783) indicates that the age of death was not related to the cause (disease or other causes).

The value of the Cox regression (z = 0.5, P = 0.612) also indicates that the age of death was not different for the different causes of death (disease or other causes such as suicide, accident or overdose).

The four causes of death separately

Again, the survival curves (Figure 2) following the classic Kaplan-Meier method overlap, indicating the absence of significant differences.

The estimated median age of death was slightly higher (44.5 years) in the accident group, and lower in the suicide group (36 years, practically indistinguishable from the overdose group, 37 years).

The Cox regression value when comparing the four causes of death is not statistically significant (P = 0.338), probably due to the very small size of three of the four groups.

The differences do not appear to be significant, although all groups have negative coefficients, i.e., a better survival rate, compared to group 1 (overdose) used as a reference. The median survival ages were similar, and the curves intersect (overdose, 37 years, and suicide, 36 years, slightly below accident, 44 years, and slightly above the mean found in the majority group, disease, 42 years).

2. Survival analysis by time period, taking the general population of Pontevedra province as reference group

In the sample, the data was divided into four periods by date of death: (1) prior to 2000; (2) 2001-2010; (3) 2011-2017; (4) 2018-2020; this last period was created to study the most recent trend as the sample size was considered sufficient to find significant effects. The data from these four periods were compared to a fifth group with random data from the 2020 census of Pontevedra province; this allowed the treatment groups of the care unit to be compared to the normal reference population.

In the Cox regression, this last group is used as the reference level, with the other periods compared to it. As can be seen in Table 1, all the regression coefficients are positive, indicating that the probability of death was higher in each of the groups compared to the reference group. Of more interest is the interpretation of the exponential of the coefficient, in the second column of the table, which shows the relative risk (RR): in the period up to 2000, the risk of death of addicts, for any age, was 696 times that of the general population; in the most recent period 2018-2020 that risk was 27.6 times higher. This shows a rapid, positive change of relative risk over time, although it remains very high in the most recent years.

The last column of the table shows the P values of the significance tests. All of them have a value of practically

Figure 1
Survival analysis by cause of mortality. Combined minority causes of mortality (other causes) versus disease

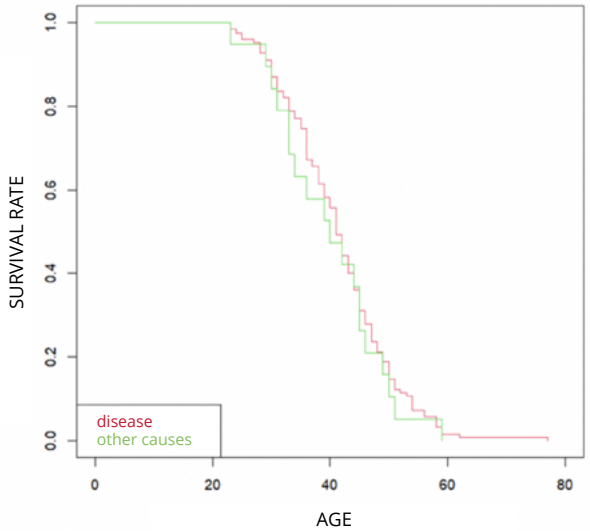


Figure 2
Survival analysis by cause of mortality. Each cause of mortality is analyzed individually

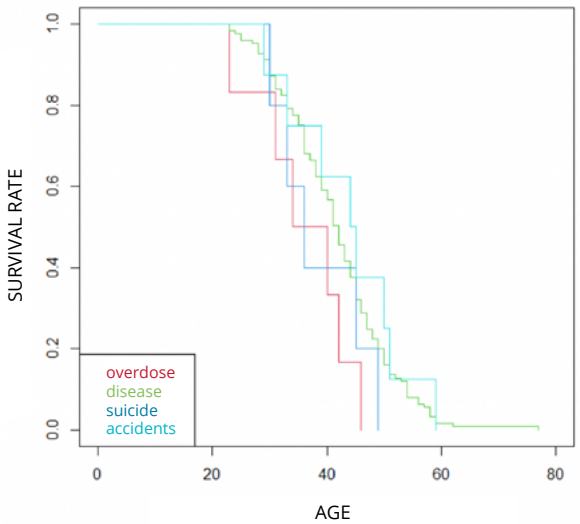


Table 1
Cox regression model applied to temporal survival in the Cangas Drug Addiction Care Unit

Comparison of periods	Regression coefficient	Relative risk	se	z	P
Period 1 versus 5	6.54	696.06	0.48	13.52	< 0.000001
Period 2 versus 5	4.81	122.76	0.44	10.72	< 0.000001
Period 3 versus 5	4.50	90.18	0.47	9.48	< 0.000001
Period 4 versus 5	3.31	27.62	0.42	7.77	< 0.000001

Note. Likelihood ratio test = 357 in 4 degrees of freedom, p = <2e-16; Wald test = 197.4 in 4 degrees of freedom, p = <2e-16, Score (logrank) test = 412.3 in 4 degrees of freedom, p = <2e-16.

zero, which means that the effects described are statistically significant, and so is the model as a whole, as indicated by the three general tests at the foot of the table.

Figure 3 shows the described effects, representing the survival curves for the five groups. The curve corresponding to the general population is clearly higher (i.e., better survival rate), and the other groups have clearly lower survival the older the period.

The median survival age in each period (1 = 31.5, 2 = 41, 3 = 45, 4 = 51, and control group 5 = 86) rises steadily for patients as the follow-up period progresses.

The mean age of death is clearly influenced by the follow-up period analysed. Until 1998 it was 31.8 (median 31), rising to 47.47 (median 47) after 1998. Applying the non-parametric Wilcoxon statistical test, a p close to 0 (W = 298.5; 2.831e-11) was obtained, indicating high statistical significance.

A scatter plot shows that the change is continuous over time; the average age, represented by the adjustment line, has risen steadily, at a constant rate, from 25 years before 1990 to more than double, 52 years, after 2015.

A regression model between age and year of death allows further analysis. The regression coefficient between age and year is clearly significant (t = 13.28; P value = 2e-16), and its estimated value of 0.77 can be interpreted as the increase in age at death, 0.77 years, for each passing year throughout the period studied.

The linear model is adequate (the graph shows a clearly linear relationship), and the coefficient of determination R-squared, 0.54, indicates that the advances represented by the passage of time explain 54.4% of the variability in the age of death. The model is also significant (F = 145.4, P value = 2.2e-16).

Sex does not have a significant influence (P = 0.39 in the sex variable regression coefficient) in this relationship between the age of death and the period in question. The age at death of men and women is not significantly different.

When observing the deaths in each period by cause, the following results were obtained: (1) 2 from overdose (33.33%), 38 from disease (30.4%), 0 from suicide (0%) and 1 from trauma (12.5%); (2) 3 from overdose (50%), 48 from disease (38.4%), 2 from suicide (40%) and 2 from trauma (25%); (3) 1 from overdose (16.66%), 20 from disease (16%), 3 from suicide (60%) and 3 from trauma (25%); (4) 0 from overdose (0%), 19 from disease (15.2%), 0 from suicide (0%) and 2 from trauma (25%). Given the low prevalence of overdose, it is not possible to determine whether these changes are statistically significant (although a clear

Figure 3
Time-period survival curves. Comparison of the 4 follow-up periods with the general population

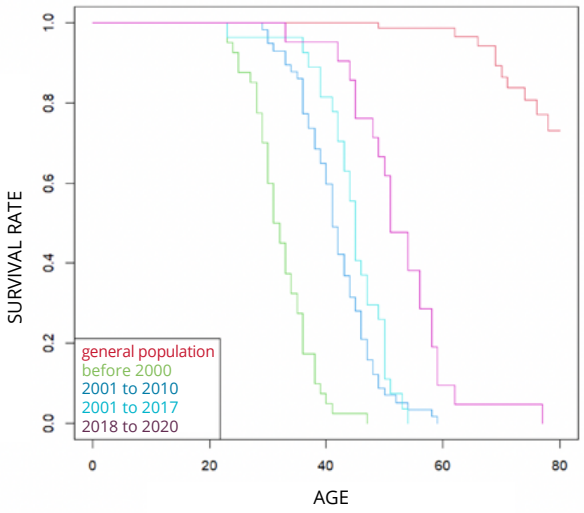


Figure 4
Dispersion graph of changes in sample mortality over time

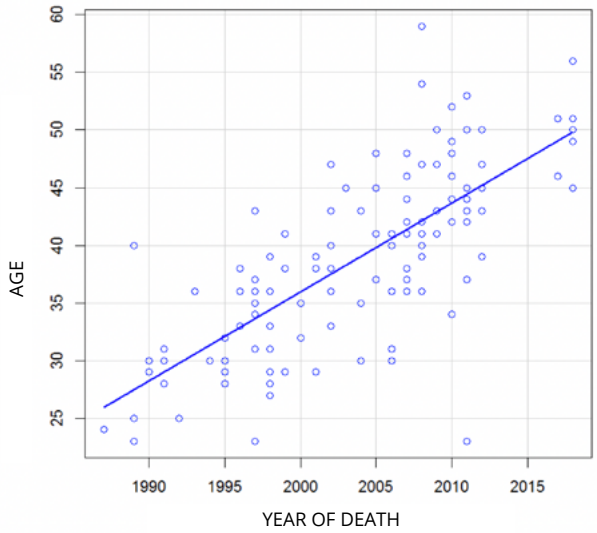


Figure 5
Survival curves by HIV infection

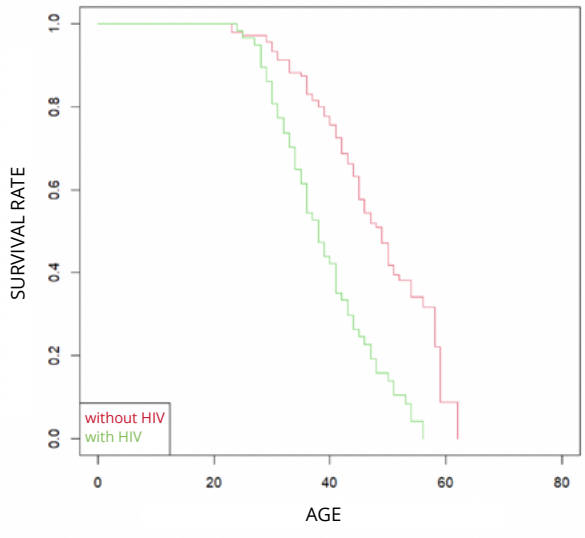
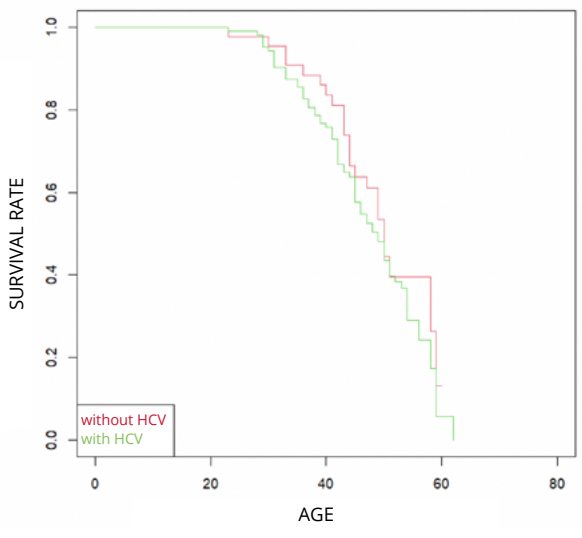


Figure 6
Survival curves by HCV infection



downward trend is observed as of 2010); the same applies to suicide and trauma (no clear trend is observed for these causes). For disease, however, a clearly significant decrease is observed as of 2010 with respect to the previous period ($p \leq 0.001$). However, there are no significant differences in the prevalence of disease between periods 3 and 4.

3. Mortality in relation to HIV/HCV infections

The Cox regression model for HIV, with survival as a function of HIV, had a P value < 0.001, indicating a clearly significant effect. The hazard ratio was 2.78, indicating that the risk of death within this group was 2.78 higher among those who had HIV compared to those who did not. Figure 5 shows a consistently lower curve, for any age, for HIV patients.

However, results changed when performing the same analysis considering three different time periods: until the year 2000, from 2000 to 2010, and from 2011 to 2020. With this temporal division, the presence of HIV was no longer significant ($p = 0.82$ for the first period, $p = 0.99$ for the second, and $p = 0.37$ for the third period). This is the result of a significant fall in the proportion of HIV over time, with HIV patients in this sample mostly concentrated in the initial periods of the study. In these initial periods, life expectancy of the group of patients in treatment was the lowest, as already shown in the previous analyses (Figure 3), with all causes of mortality at their strongest.

For HCV, the Cox regression model, with survival as a function of HCV, has a P value = 0.357, indicating a non-significant effect. Mortality does not seem be dependent on HCV, as can be seen in Figure 6.

Discussion

The data presented in the results section allows the following conclusion to be quickly drawn: The addicted patients who participated in this study have a lower survival age than that of the general population in the same geographical area, although this age has been rising over time, from 1986 to 2020.

The premature death of patients participating in this study has been a common finding in this type of population, as highlighted in different studies of patients addicted to substances, particularly heroin (Bahji et al., 2020; Cruts et al., 2008; Degenhardt et al., 2011; EMCDDA, 2020; Giraudon et al., 2012; Jiménez-Treviño et al., 2023; Jiménez-Treviño et al., 2011; Mathers et al., 2013). This premature mortality is sustained even despite the rise in age of death in recent years.

The results of the study reflect a mixed reality of care. On the one hand, the survival age has been rising, as could in part be expected given the increase in the age of patients in treatment who were incorporated at the beginning of the study. This statistically significant fact points to the positive effect that methadone/buprenorphine maintenance programs have had, the decrease in use of the parenteral route, and the universalization of the treatment of concomitant HIV and HCV infections (Bahji et al., 2019; Kimber, Larney, Hickman, Randall & Degenhardt, 2015; Krawczyk et al., 2020; Lozano, Domeque, Perálvarez, Torrellas & Gonzalo, 2019; Mathers & Degenhardt, 2014; Sordo et al., 2017). Nevertheless, the survival age of these patients has not reached that of the general population, despite all the advances mentioned, and this undoubtedly indicates that there are harmful factors associated with

substance addiction that have not yet been fully neutralized in these patients (Bahji et al., 2020).

Another clear result of this study is that the attribution of mortality in the sample of patients is linked to clinical disease in general (84%), and to a lesser extent (16%), to another group of causes (overdose, suicide or trauma). This result, as already indicated in the introduction, is unusual in mortality studies involving such patients, although previous studies already indicate that this distribution of mortality is common in samples of older patients (Stenbacka, Leifman & Romelsjö, 2010). In our opinion. this difference is related to the design of the study; when carrying out a prospective study, with a very comprehensive follow-up of patients and access to the general clinical records, numerous cases of death from disease are detected that go unnoticed in other types of study (Bahji et al., 2020; Cruts et al., 2008; Mathers et al., 2013). As will be discussed below, this exhaustive follow-up was accompanied by intense health, psychological, and social treatment that also influenced the results, and could explain why mortality rates in Spain are lower than those in Europe (EMCDDA, 2020).

The influence of HIV as a factor generating diseases and mortality is reflected in the results. HIV is associated with higher mortality globally, but when performing the analysis by time period this significance is lost since HIV infections were more prevalent in the first years of the study, when mortality was at its highest in these patients. However, the relationship between the presence of HIV/HCV and the main cause of mortality, disease, is clear throughout the study. Of the 125 patients who died from this cause, 97 were HIV or HCV positive (77.66%, $p \leq 0.001$).

Initially, it could be considered that viral infections, in fact, all infections typical of parenteral drug use, would explain the results of this study. HIV infection, and since the end of the 1990s, the infectious liver diseases HCV and hepatitis B virus (HBV), which have doubled their prevalence compared to HIV (29), are the main infectious threat of the parenteral route, but not the only one; bacterial and fungal abscesses, embolisms, and endocarditis are also highly prevalent in users of this route.

The large-scale abandonment of the parenteral route, and the advances in treating these infections could explain the improvement observed in the present study in relation to the survival age of patients, and above all through a decrease in the prevalence of death by disease after 2010.

This development is clearly seen in a study carried out between 2005 and 2010 in patients from all drug addiction care units in Galicia, including the one in which this study was performed, which thus involved a very similar sample. This study analyzed the new requests for heroin addiction treatment (Flórez et al., 2015). In the 1,655 patients analyzed, the presence of HIV was found in 7.4% of the sample, and HCV in 19.9%. These data correlated with low use of the parenteral route, only present in 15.6% of the sample (Flórez et al., 2015), and contrasted with previous longitudinal studies indicating the presence of HIV in 47.2% of heroin addicts, and HCV, together with HBV, in 81.1% (Giraudon et al., 2012). This reduction in viral infections would also affect the other infections, bacterial or fungal, typical of the parenteral route, a fact that would also contribute to reducing mortality.

On the other hand, and despite these favourable aspects of care, it is noted that this improvement is not strong enough to allow comparisons of patient survival age to that of the general population; this is confirmed by the absence of a significant difference in the prevalence of deaths from disease between periods 3 and 4. Undoubtedly, other factors continue to be involved that prevent this gap from being closed. Unhealthy habits, such as sedentary lifestyle and poor diet, together with polydrug use, especially tobacco, alcohol and stimulants, typical of this population, would explain why the difference to the general population continues (Morris & Garver-Apgar, 2020; Pajusco et al., 2012). In addition, polydrug use reduces adherence to treatment in general, and to antiretrovirals in particular (González-Álvarez, Madoz-Gurpide, Parro-Torres, Hernández-Huerta & Ochoa Mangado, 2019). The aforementioned COPSIAD study serves as an example. Of the 805 patients (35% of the total) whose main substance of abuse was heroin, 43.1% were also addicted to cocaine, 30.7% were addicted to cannabis and 19.2% to alcohol (Pereiro et al., 2013). Furthermore, the COPSIAD study also indicated the high comorbidity of heroin addicts in Galicia with other non-addictive psychiatric disorders (7.6% psychotic disorders, 20.6% mood disorders, 11.9% anxiety disorders and 26.5% personality disorders). It is well known that non-addictive psychiatric disorders also have a high comorbidity with physical illnesses related to unhealthy lifestyles. Thus, it is clear that this comorbidity, or dual pathology, contributes to maintaining this significant difference in life expectancy in the present sample with respect to the general population, where these disorders are not as prevalent (Pereiro et al., 2013), as previous studies have already indicated (Fridell et al., 2019).

Tobacco use is also very prevalent in this population, with studies indicating a prevalence of over 80% and great difficulty in quitting (Morris & Garver-Apgar, 2020; Pajusco et al., 2012). Therefore, smoking and its morbidity and mortality also contribute to maintaining a significant difference between the study population and the general population with regard to life expectancy.

It is easy to conclude that it is this unhealthy lifestyle, resulting from polydrug use and psychiatric comorbidity, together with the ageing suffered by the participants in this study, which, compared to the general population, has increased the risk of presenting certain diseases, especially oncological and cardiovascular, which in turn has kept diseases as the main cause of death in the study. In addition,

these diseases have counteracted the beneficial effect of control of infectious diseases associated with the parenteral route, so prevalent in this population, and have prevented the disappearance of the significant differences in survival age compared to the general population, as shown by the evolution of the prevalence of deaths by disease. Despite this, the beneficial effect of the intense health control carried out in this population is evident when observing a clear improvement in the survival age over time, and in the low rates of death by suicide, overdose or accident. It should be remembered that in these latter cases, the presence of an effective public health system capable of responding urgently makes a very significant difference (Bahji et al., 2020; Cruts et al., 2008; Degenhardt et al., 2006).

The results of this study must be interpreted within the healthcare context in which the data were collected. Participants attended a treatment program with health, psychological and social coverage, reducing mortality due to suicide, overdose and trauma. In addition, the presence of a permanent emergency public health intervention service also helps reduce mortality from suicide, overdose and trauma. The decline in the prevalence of injecting, coupled with decreasing purity of available heroin has also contributed to reduced overdose mortality. All these factors have also helped, as the results of this study indicate, to reduce mortality from disease, but unhealthy lifestyles are generating morbidity and mortality linked to various infectious, cardiovascular, endocrinological or oncological diseases that increase with age and explain the evolution of the data in this study.

Finally, it should be noted that there is a tendency for men to have higher mortality compared to women in the present study, but without a significant difference in the mean age of death. Taken together, the results indicate a risk that is higher for men, but not as intense as in other studies (Brugal et al., 2016; Onyeka et al., 2015).

Limitations

This study has some limitations worthy of note. Although the study participants were originally mainly from the Morrazo and Vigo health area, with hardly any patients coming from places outside the study area, it is possible that undetected movement occurred and that some of these patients from outside the health area died without the cause of death being recorded. Nevertheless, it can be noted that the percentage of patients with missing cause of death data throughout the study was less than 1%.

It must be taken into account that all data in this study were collected by the same researcher, which improves internal validity; however, cause of death was not determined on the basis of a common prior protocol for the entire health area, but was rather based on the records of the daily activity of the health professionals involved. This fact is important when discriminating between accidental overdoses and suicides, but it does not significantly affect deaths from disease.

As the study was conducted in a health setting, it is possible that deaths caused by causes other than disease which were not recorded directly by health personnel were underestimated.

With regard to sample size, a larger sample would have made it possible to obtain results with higher statistical power.

Finally, the causes of mortality occurring in the sample throughout the study period (1986-2020) were compared with the causes of death in the general population of the Pontevedra health area that occurred in 2020. Although it is the case that the general population encompasses the study sample, it is possible that the causes of death in the general population have changed over the years. Nevertheless, life expectancy in the general population has done nothing but improve throughout the study, and this fact indicates that there is no significant bias in how the comparison of life expectancy developed in the study patients compared to the general population.

Conclusions

1. The opioid-addicted population followed in this study had a higher premature mortality rate, maintained over time, than the general population in the same area, the province of Pontevedra, with a steady reduction over recent years. This positive development is the result of the intense multidisciplinary treatment to which these patients have free access.
2. Despite this intense multidisciplinary treatment, the unhealthy lifestyle of these patients generated a higher prevalence of risk factors for various diseases than in the general population. This has led to the appearance of a 'plateau' effect in the deaths from disease prevalence, and thus in the overall mortality of patients, which prevented them from having a life expectancy similar to that of the general population.
3. The opioid-addicted population followed in this study presented the same causes of premature mortality as the usual causes referred to in the EMCDDA studies (1): 1. Overdose / 2. Diseases / 3. Suicide / 4. Trauma, disease being the primary cause of mortality.

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

Bahji, A., Cheng, B., Gray, S. & Stuart, H. (2019). Reduction in mortality risk with opioid agonist therapy: A systematic review and meta-analysis. *Acta Psychiatrica Scandinavica, 140*, 313-339. doi:10.1111/acps.13088.

Bahji, A., Cheng, B., Gray, S. & Stuart, H. (2020). Mortality among people with opioid use disorder: A systematic review and meta-analysis. *Journal of Addiction Medicine, 14*, 118-132. doi:10.1097/adm.0000000000000606.

Brugal, M. T., Molist, G., Sarasa-Renedo, A., de la Fuente, L., Espelt, A., Mesías, B.,… Barrio, G. (2016). Assessing gender disparities in excess mortality of heroin or cocaine users compared to the general population. *The International Journal on Drug Policy, 38*, 36-42. doi:10.1016/j.drugpo.2016.10.009.

Carrasco-Barrios, M. T., Huertas, P., Martín, P., Martín, C., Castillejos, M. C., Petkari, E. & Moreno-Küstner, B. (2020). Determinants of suicidality in the European general population: A systematic review and meta-analysis. *International Journal of Environmental Research and Public Health, 17*. doi:10.3390/ijerph17114115.

Colom, J., Szerman, N., Sabater, E., Ferre, F., Pascual, F., Gilabert-Perramon, A.,… M, C. D. A. O. U. D. (2021). Study to determine relevant health outcome measures in opioid use disorder: Multicriteria decision analysis. *Adicciones, 33*, 109-120. doi:10.20882/adicciones.1263.

Cruts, G., Buster, M., Vicente, J., Deerenberg, I. & Van Laar, M. (2008). Estimating the total mortality among problem drug users. *Substance Use and Misuse, 43*, 733-747. doi:10.1080/10826080701202643.

Degenhardt, L., Bucello, C., Mathers, B., Briegleb, C., Ali, H., Hickman, M. & McLaren, J. (2011). Mortality among regular or dependent users of heroin and other opioids: A systematic review and meta-analysis of cohort studies. *Addiction, 106*, 32-51. doi:10.1111/j.1360-0443.2010.03140.x.

Degenhardt, L., Hall, W. & Warner-Smith, M. (2006). Using cohort studies to estimate mortality among injecting drug users that is not attributable to AIDS. *Sexually Transmitted Infections, 82 (Suppl. 3)*, 56-63. doi:10.1136/sti.2005.019273.

Dennis, F. (2021). Drug fatalities and treatment fatalism: Complicating the ageing cohort theory. *Sociology of Health and Illness, 43*, 1175-1190. doi:10.1111/1467-9566.13278.

EMCDDA. (2020). European Drug Report 2020: Trends and developments. *In Addiction EMCfDaD, editor. Luxembourg: Publications Office of the European Union*, 88. doi:10.2810/420678.

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. doi:10.2147/ndt.S84431.

Fridell, M., Backstrom, M., Hesse, M., Krantz, P., Perrin, S. & Nyhlen, A. (2019). Prediction of psychiatric comorbidity on premature death in a cohort of patients with substance use disorders: A 42-year follow-up. *BMC Psychiatry, 19*, 150. doi:10.1186/s12888-019-2098-3.

Giraudon, I., Vicente, J., Matias, J., Mounteney, J. & Griffiths, P. (2012). Reducing drug related mortality in Europe - a seemingly intractable public health issue. *Adicciones, 24*, 3-7.

González-Álvarez, S., Madoz-Gurpide, 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. *Adicciones, 31*, 8-17. doi:10.20882/adicciones.916.

Hickman, M., Steer, C., Tilling, K., Lim, A. G., Marsden, J., Millar, T.,… Macleod, J. (2018). The impact of buprenorphine and methadone on mortality: A primary care cohort study in the United Kingdom. *Addiction, 113*, 1461-1476. doi:10.1111/add.14188.

Horon, I. L., Singal, P., Fowler, D. R. & Sharfstein, J. M. (2018). Standard death certificates versus enhanced surveillance to identify heroin overdose-related deaths. *American Journal of Public Health, 108*, 777-781. doi:10.2105/ajph.2018.304385.

Jiménez-Treviño, L., Martínez-Cao, C., Sánchez-Lasheras, F., Iglesias, C., Antuña, M. J., Riera, L.,… Bobes, J. (2023). A 35-year follow-up study of patients admitted to methadone treatment between 1982-1984 in Asturias, Spain. *Adicciones 35* (3), 303-314. http://dx.doi.org/10.20882/adicciones.1662

Jiménez-Treviño, L., Sáiz, P. A., García-Portilla, M. P., Díaz-Mesa, E. M., Sánchez-Lasheras, F., Burón, P.,… Bobes, J. (2011). A 25-year follow-up of patients admitted to methadone treatment for the first time: Mortality and gender differences. *Addictive Behaviors, 36*, 1184-1190. doi:10.1016/j.addbeh.2011.07.019.

Kimber, J., Larney, S., Hickman, M., Randall, D. & Degenhardt, L. (2015). Mortality risk of opioid substitution therapy with methadone versus buprenorphine: A retrospective cohort study. *Lancet Psychiatry, 2*, 901-908. doi:10.1016/s2215-0366(15)00366-1.

Krawczyk, N., Mojtabai, R., Stuart, E. A., Fingerhood, M., Agus, D., Lyons, B. C.,… Saloner, B. (2020). Opioid agonist treatment and fatal overdose risk in a state-wide US population receiving opioid use disorder services. *Addiction, 115*, 1683-1694. doi:10.1111/add.14991.

Larney, S., Tran, L. T., Leung, J., Santo, T., Jr., Santomauro, D., Hickman, M.,… Degenhardt, L. (2020). All-cause and cause-specific mortality among people using extramedical opioids: A systematic review and meta-

analysis. *JAMA Psychiatry, 77*, 493-502. doi:10.1001/jamapsychiatry.2019.4170.

Lozano, R., Domeque, N., Perálvarez, C., Torrellas, M. D. & Gonzalo, C. (2019). Mortality rate in patients on methadone treatment and infected with the human immunodeficiency virus and/or the hepatitis C virus. *Adicciones, 31*, 78-79. doi:10.20882/adicciones.1007.

Ma, J., Bao, Y. P., Wang, R. J., Su, M. F., Liu, M. X., Li, J. Q.,… Lu, L. (2019). Effects of medication-assisted treatment on mortality among opioids users: A systematic review and meta-analysis. *Molecular Psychiatry, 24*, 1868-1883. doi:10.1038/s41380-018-0094-5.

Martins, S. S., Sampson, L., Cerdá, M. & Galea, S. (2015). Worldwide prevalence and trends in unintentional drug overdose: A systematic review of the literature. *American Journal of Public Health, 105*, 29-49. doi:10.2105/ajph.2015.302843.

Mathers, B. M. & Degenhardt, L. (2014). Examining non-AIDS mortality among people who inject drugs. *Aids, 28 (Suppl. 4)*, 435-444. doi:10.1097/qad.0000000000000435.

Mathers, B. M., Degenhardt, L., Bucello, C., Lemon, J., Wiessing, L. & Hickman, M. (2013). Mortality among people who inject drugs: A systematic review and meta-analysis. *Bulletin of the World Health Organization, 91*, 102-123. doi:10.2471/blt.12.108282.

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. doi:10.1016/j.drugpo.2017.11.011.

Morris, C. D. & Garver-Apgar, C. E. (2020). Nicotine and opioids: A call for co-treatment as the standard of care. *The Journal of Behavioral Health Services and Research, 47*, 601-613. doi:10.1007/s11414-020-09712-6.

Onyeka, I. N., Beynon, C. M., Hannila, M. L., Tiihonen, J., Föhr, J., Tuomola, P.,… Kauhanen, J. (2014). Patterns and 14-year trends in mortality among illicit drug users in Finland: The HUUTI study. *The International Journal on Drug Policy, 25*, 1047-1053. doi:10.1016/j.drugpo.2014.07.008.

Onyeka, I. N., Beynon, C. M., Vohlonen, I., Tiihonen, J., Föhr, J., Ronkainen, K. & Kauhanen, J. (2015). Potential years of life lost due to premature mortality among treatment-seeking illicit drug users in Finland. *Journal of Community Health, 40*, 1099-1106. doi:10.1007/s10900-015-0035-z.

Pajusco, B., Chiamulera, C., Quaglio, G., Moro, L., Casari, R., Amen, G.,… Lugoboni, F. (2012). Tobacco addiction and smoking status in heroin addicts under methadone vs. buprenorphine therapy. *International Journal of Environmental Research and Public Health, 9*, 932-942. doi:10.3390/ijerph9030932.

Park, T. W., Larochelle, M. R., Saitz, R., Wang, N., Bernson, D. & Walley, A. Y. (2020). Associations between prescribed benzodiazepines, overdose death and buprenorphine discontinuation among people receiving buprenorphine. *Addiction, 115*, 924-932. doi:10.1111/add.14886.

Pereiro, C., Pino, C., Flórez, G., Arrojo, M. & Becoña, E. (2013). Psychiatric comorbidity in patients from the addictive disorders assistance units of Galicia: The COPSIAD study. *PLoS One, 8*, 66451. doi:10.1371/journal.pone.0066451.

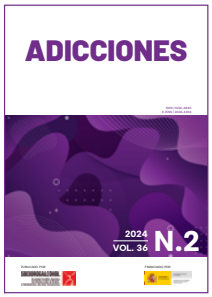
Slavova, S., Delcher, C., Buchanich, J. M., Bunn, T. L., Goldberger, B. A. & Costich, J. F. (2019). Methodological complexities in quantifying rates of fatal opioid-related overdose. *Current Epidemiology Reports, 6*, 263-274. doi:10.1007/s40471-019-00201-9.

Sordo, L., Barrio, G., Bravo, M. J., Indave, B. I., Degenhardt, L., Wiessing, L.,… Pastor-Barriuso, R. (2017). Mortality risk during and after opioid substitution treatment: Systematic review and meta-analysis of cohort studies. *BMJ (Clinical Research Edition), 357*, 1550. doi:10.1136/bmj.j1550.

Stenbacka, M., Leifman, A. & Romelsjö, A. (2010). Mortality and cause of death among 1705 illicit drug users: A 37 year follow up. *Drug and Alcohol Review, 29*, 21-27. doi:10.1111/j.1465-3362.2009.00075.x.

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

ADICCIONES
2024 ■ VOL. 36 ■ N. 2 ■ PAGES 217–226
www.adicciones.es



ORIGINAL

Changes in cannabis use in Spanish consumers during the COVID-19 lockdown according to gender, age, living situation and addiction level

Cambios en el consumo de cannabis en consumidores españoles durante el confinamiento por la COVID-19 según sexo, edad, situación de convivencia y nivel de adicción

Víctor José Villanueva-Blasco*, **, Bárbara González Amado*, **, Verónica Villanueva-Silvestre*,**, Andrea Vázquez-Martínez*, **, Manuel Isorna Folgar***.

* Facultad de Ciencias de la Salud. Universidad Internacional de Valencia. Valencia, España.

** Grupo de Investigación en Salud y Ajuste Psico-Social (GI-SAPS). Universidad Internacional de Valencia. Valencia, España.

*** Facultad de Ciencias de la Educación y Trabajo Social. Universidad deVigo. Ourense, España.

Abstract

The objective was to analyze the changes in cannabis use during lockdown considering sex, age, living situation and level of addiction. This descriptive and non-probabilistic study used a convenience sample of 208 participants with ages between 18-57 years (64.3% men; mean age = 31.39 years), that reported consuming cannabis. The frequency of distinct typologies of cannabis use was analyzed and the level of addiction with the Cannabis Abuse Screening Test (CAST). An online survey was used to collect the variables under study. A total of 25% consumers increased their spliff (marijuana mixed with tobacco) consumption, 11.9% increased their joint (marijuana cigarette) consumption and 11.8% increased their hashish spliff consumption. Men had higher levels of cannabis addiction, however, during lockdown they reduced their marijuana spliff consumption while both men and women increased their joint consumption. Marijuana spliff consumption showed a greater increase in the 25-29 age group, in those living with people other than relatives or a partner, alone, or with a partner and was reduced mainly in those living with parents or other relatives. The living alone 18-24 years old group, and the living with parents 35-44 years old group showed higher levels of cannabis addiction (CAST). The rate of dependent consumers who increased their marijuana spliff consumption (49%) doubled compared to consumers with no addiction and moderate addiction. Regarding joints, consumption was 1.5 times higher than for moderate addiction consumers and three times higher than those with no addiction. The risk of cannabis addiction increased in certain groups during lockdown.

Keywords: cannabis, addiction, gender, age, living situation

Resumen

El objetivo fue analizar el consumo de cannabis durante el confinamiento según sexo, edad, situación de convivencia y nivel de adicción. Estudio descriptivo no probabilístico con una muestra de conveniencia de 208 participantes con edades entre 18-57 años (64,3% hombres; edad media = 31,39 años) que reportaron consumir cannabis. Se analizó la frecuencia de distintas tipologías de consumo de cannabis y el nivel de adicción con el Cannabis Abuse Screening Test (CAST). La recogida de datos se realizó mediante encuesta online. El 25% de consumidores aumentó su consumo de porros de marihuana mezclada con tabaco; el 11,9% de cigarros de marihuana; y el 11,8% de porros de hachís mezclado con tabaco. Los hombres presentaron mayor nivel de adicción al cannabis. Sin embargo, redujeron su consumo de porros durante el confinamiento. Hombres y mujeres incrementaron su consumo de cigarros de marihuana. El consumo de porros se incrementó mayormente en el grupo de 25-29 años, entre quienes convivían con personas distintas a familiares y pareja, vivían solas, o en pareja; y se redujo entre quienes vivían con progenitores o familiares. Mostraron mayor nivel de adicción al cannabis (CAST) el grupo entre 18-24 años que vive solo y el grupo entre 35-44 años que convive con sus progenitores. Los consumidores con dependencia que incrementan su consumo de porros (49%) fue dos veces superior respecto a los grupos sin adicción y con adicción moderada. El consumo de cigarros de marihuana (20,8%) fue 1,5 veces superior que para adicción moderada y más del triple que para sin adicción. El riesgo de adicción a cannabis aumentó en ciertos grupos durante el confinamiento.

Palabras clave: cannabis, adicción, género, edad, situación de convivencia

■ *Received: July 2022; Accepted: November 2022.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Manuel Isorna Folgar. Facultad de Ciencias de la Educación y Trabajo Social. Campus As Lagoas. Universidad de Vigo, 32004. Ourense, España.
Email: isorna.catoira@uvigo.es

Even though cannabis availability saw a decline during the COVID-19 pandemic lockdown period, it remained the most widely available illegal drug (Boehnke, McAfee, Ackerman & Kruger, 2021; Rolland et al., 2020; Van Laar et al., 2020) and one of the most sought-after (European Monitoring Center for Drugs and Drug Addiction & Europol, 2020). Its sale increased between January and March 2020 (EMCDDA & Europol, 2020), when recreational consumers seemed to stock up before the lockdown (Cherkasova, 2020). Despite several studies suggesting that there has been an increase in cannabis use during the pandemic (Bartel, Sherry & Stewart, 2021), cannabis use patterns in Europe remained relatively stable during lockdown compared to before the pandemic (EMCDDA, 2020). However, these studies do not report how the lockdown affected the frequency of use or the amount of cannabis consumed on each occasion; important factors linked to negative health consequences (Fischer et al., 2017). Nor have studies considered the role of certain sociodemographic variables, such living situation during lockdown, something only Vanderbruggen et al. (2020) and Villanueva-Blasco, Villanueva-Silvestre, Vázquez-Martínez, Rial & Isorna (2021) did in the case of alcohol.

Lockdown measures led to the modification of multiple social dynamics, such as the closure of educational centers and universities and changes in family living situations. This meant that young people spent more time with family and less time in contexts conducive to substance use (Bollen et al., 2021; Graupensperger et al., 2021).

Family living conditions also led to an increase in care obligations due to school closures. Children were attending school online from their own home or were carrying out their educational tasks there. Lockdown also implied greater attention to sick or dependent relatives (Beach, Schulz, Donovan & Rosland, 2021; Lee, Ward, Chang & Downing, 2021). Such care responsibilities fell disproportionately on females (Giurge, Whillans & Yemiscigil, 2021; Zamarro & Prados, 2021) and were associated with higher anxiety and depression symptoms (Russell, Hutchison, Tambling, Tomkunas & Horton, 2020).

The different forms of cannabis use are a topic of interest for the development of public policies and for the design of preventive and treatment interventions. The most common form of cannabis use in Europe and Spain is mixed with tobacco, mainly in the format known as spliffs. Spliffs can be of two types: tobacco with marijuana (the crushed mixture of the bud and leaves near the plant) or tobacco with hashish (the resinous secretions of the plant), being in Spain the majority consumption of marijuana spliffs mixed with tobacco (Isorna, Villanueva-Blasco, Veiga & Otero-Requeijo, 2020). This dual consumption establishes a difference with respect to the consumption of cannabis cigarettes alone, as it encourages the continued use of both substance (Hindocha, Freeman, Ferris, Lynskey & Winstock, 2016), and is associated with increased symptoms of cannabis dependence (Richter, Pugh & Ball, 2016; Schauer & Peters, 2018). Analyzing how COVID-19 confinement may have modified cannabis use pattern is of particular interest in the case of dual use mixed with tobacco.

The objective of the present study was to analyze the changes in cannabis use patterns during the COVID-19 lockdown period. In contrast to other studies, several typologies of cannabis use were considered in this study, including dual cannabis-tobacco use, as well as analyzing possible changes according to several sociodemographic variables, such as gender, age and cohabitation status. We also explored whether these variables and their interaction mediated the level of cannabis addiction. Finally, we analyzed whether the number of marijuana spliffs that users obtained with one gram of marijuana increased or decreased during confinement, considering their level of addiction.

Method

Design

This study is descriptive and non-probabilistic, and uses convenience sampling. An online survey was used to collect the variables under study. Age ranges were established based on those that showed adequate Internet access, as stated in the Equipment and Use of Information and Communication Technologies at Home Survey (Instituto Nacional de Estadística, 2019).

Participants

Of the total sample of participants (N = 3,780), 7.86% (n = 208) reported using cannabis in at least one of its forms before and/or during lockdown, this being the sample on which the analyses were performed. A total of 35.7% (n = 74) were female and 64.3% (n = 134) were male, aged between 18 and 64 (M = 31.4, SD = 9.5). As for age, 27.7% (n = 58) were between the ages of 18 and 24, while 24.5% (n = 51) were between 25 and 29, some 18% (n = 37) were between 30 and 34, a further 17% (n = 35) between 35 and 44, only 10% (n = 21) were between 45 and 54, and 2.8% (n = 6) between 55 and 64.

Regarding living situation during lockdown, 6.1% (n = 13) of the participants reported living alone, 32.1% (n = 67) lived with their parents or other relatives, 31.9% (n = 66) lived with a partner, 9.1% (n = 19) shared a flat with people other than relatives or a partner, and 9.40% (n = 20) were in various living situations. A total of 11.5% of consumers did not answer this question, so they were excluded from subsequent analyses in which this variable was taken into account. Regarding the level of education, more than half (66.7%) had university studies, 20% had

completed vocational training, 8.9% had completed high school, 3.2% had secondary education and only 1.1% had primary education.

Instruments

The sociodemographic variables were: a) gender (male, female); b) age, using the age ranges established by the EDADES survey (Observatorio Español de las Drogas y las Adicciones, 2021) (18-24 years, 25-29 years, 30-34 years, 35-44 years, 45-54 years, 55-64 years); and c) living situation: (1) lives alone; (2) lives with parents or other relatives; (3) lives with a partner; (4) shares a flat with people who are neither relatives nor a partner; (5) another living situation.

To analyze the consumption of cannabis and its derivatives, the following types were considered: a) marijuana spliff; b) joint (marijuana cigarette); c) hashish spliff; d) marijuana mixed with hashish; e) CBD oil; and f) synthetic cannabis. For each, the following were evaluated:

a. Days of consumption per month during the previous six months, using the EDADES survey (Plan Nacional Sobre Drogas, 2020) as a reference for consumption in the last 30 days.
b. Frequency of days of consumption in the previous seven days (from 0 to 7 days) during lockdown.
c. Daily average amount before the pandemic and during lockdown.
d. Number of joints obtained with 1 gram of marijuana and with 1 gram of hashish, before the pandemic and during lockdown.

The Cannabis Abuse Screening Test (CAST) scale (Legleye, Karila, Beck & Reynaud, 2007), in the validated Spanish translation (Klempova et al., 2009) that consists of 6 items, was used for the detection of cannabis abuse patterns. Although the original authors proposed a binary coding of the items, the study on the psychometric properties of the instrument with a Spanish sample by Cuenca-Royo et al. (2012) showed that the full coding of the CAST is more informative and has greater criterion validity than the binary version. For this reason, the present study used the cut-off points proposed by Cuenca-Royo et al. (2012) in full coding: 7 for moderate addiction (DSM-5) and 9 for dependence (DSM-IV).

Procedure

Data collection started on April 14th 2020, after the first 30 days of confinement measures, and ended on May 29th, when the de-escalation measures started. The data collection strategy was a survey hosted on a web, with dissemination using posts on social media and advertisements via e-mail and smartphone messaging applications. Participants were informed that participation was voluntary, in accordance with the Spanish Organic Law 3/2018, of December 5, of Personal Data Protection and Digital Rights Guarantee (2018). They were asked to give their consent to participate. Selection criteria were: a) age between 18 and 64; b) explicit agreement to participate; and c) properly filling out the survey. The exclusion criteria were: a) missing values or inconsistent response patterns; b) age outside the range of 18-64 years.

Statistical analysis

A preliminary exploratory analysis of sociodemographic variables and consumption patterns was carried out.

At the univariate level, descriptive analyses of sociodemographic variables were carried out to describe the research participants. Likewise, the student's *t-test* (or its non-parametric Z Wilcoxon equivalent) of repeated measures was used to examine the differences in the average daily consumption of cannabis before and during lockdown, and the chi-square test was used to evaluate the relationship between categorical variables.

The prevalence in the reduction, increase and maintenance of the average cannabis consumption in its different forms was calculated according to gender, age, living situation, and level of addiction to cannabis. For these analyses, only the typologies with the highest prevalence of use and/or had shown significant differences were considered in the average daily consumption of cannabis before and during lockdown. Note that maintenance can refer both to the lack of changes in those who consumed each specific form of cannabis or its derivatives, and among cannabis users who used some type of use before the pandemic and continued without using it during the lockdown.

In order to analyze whether the sociodemographic variables gender, age (recoded in intervals) and living situation and their interaction mediate differences in the level of cannabis addiction, a three-factor analysis of variance was carried out.

The results for the difference of means and the relationships between categorical variables were transformed to Cohen's d effect size and to correlation (phi), respectively.

The data was analyzed with the IBM SPSS Statistics package version 25.

Results

The most common form of cannabis use was the marijuana spliff, both before (72.9%) and during lockdown (52%), followed by hashish spliff (22.4% before, 21.2% during). A total of 69.2% of females and 75% of males reported daily cannabis use before lockdown, and 22.2% of females and 22.5% of males reported daily use of hashish spliff.

Regarding average daily cannabis use (Table 1), a significant decrease in the use of marijuana spliffs was observed during lockdown compared to before lockdown, $t\,(169) = 2.25$, $p = .026$, $d = 0.21$. By contrast, the average

daily consumption of joints increased significantly during lockdown, $Z = -3.20$, $p = .005$, $r = -.44$. The other forms of consumption remained stable.

Disaggregating the data by gender (Table 1), a statistically significant decrease in marijuana spliff consumption during lockdown was found in males, and a significant increase in the use of joints for the same period. For females, the average daily consumption of marijuana spliffs was similar in both periods, but the consumption of joints increased significantly during lockdown.

Taking into account the CAST results (Table 2), 30.7% ($n = 64$) of the users did not show addiction, 58.3% ($n = 121$) had moderate addiction, and 11% ($n = 23$) showed dependency. The distribution of frequencies by gender revealed that 56.7% of females and 76.1% of males showed moderate addiction or dependence on cannabis.

The analysis of the relationship between consumers' gender and consumption levels (Table 2) was statistically significant, $\chi^2(2) = 8.63$, $p = .013$, Cramer's V = .20. Specifically, post hoc analysis only showed a significantly higher percentage of males than females, $\chi^2(1) = 8.75$, $p = .003$, $\phi = .22$ with moderate cannabis addiction (73.1%, $n = 87$ males vs. 51.5%, $n = 34$ females) compared to those who did not present any addiction.

Before lockdown, almost half of the moderately addicted sample (47.2% females and 46.2% males) and more than half of the dependent sample (66.7% females and 55.6% males) reported using cannabis 20 days or

Table 1
Differences in mean daily cannabis use before and during lockdown (paired samples t - test)

Substance	Sample	Consumption before lockdown *M (SD)*	Consumption during lockdown *M (SD)*	*t/Z*	*p*	*d/r*
Marijuana spliff	Overall (*n* = 170)	1.8 (1.8)	1.4 (1.7)	2.25	**.026**	0.21
	Female (*n* = 59)	1.6 (2.1)	1.2 (1.4)	1.09	.279	
	Male (*n* = 110)	2.0 (1.7)	1.6 (1.9)	2.01	**.047**	0.22
Joint (marijuana cigarette)	Overall (*n* = 52)	0.6 (0.6)	1.4 (1.3)	-3.20	**.001**	-0.44
	Female (*n* = 16)	0.7 (0.5)	1.5 (1.4)	-1.97	**.048**	-0.49
	Male (*n* = 36)	0.6 (0.68)	1.3 (1.3)	-2.52	**.011**	-0.42
Hashish spliff	Overall (*n* = 57)	1.8 (2.3)	2.0 (2.8)	-0.58	.563	
	Female (*n* = 29)	1.4 (1.7)	2.0 (3.7)	-1.05	.294	
	Male (*n* = 44)	2.0 (2.6)	2.0 (2.2)	-1.08	.280	
Marijuana mixed with hashish	Overall (*n* = 13)	0.7 (0.4)	0.9 (0.9)	-0.79	.426	
	Female (*n* = 5)	0.6 (0.5)	1.2 (1.1)	-1.13	.257	
	Male (*n* = 8)	0.7 (0.4)	0.7 (0.8)	-0.10	.914	
Oil (CBD)	Overall (*n* = 15)	0.8 (0.5)	0.8 (0.6)	-0.31	.755	
	Female (*n* = 5)	1.2 (0.4)	1.0 (0.5)	-1.00	.317	
	Male (*n* = 10)	0.6 (0.5)	0.8 (0.7)	-0.58	.557	
Synthetic cannabis	Overall (*n* = 6)	0.6 (0.5)	1.1 (0.4)	-1.73	.083	
	Female (*n* = 2)	1.0 (0.0)	0.5 (0.7)	-1.00	.317	
	Male (*n* = 4)	0.5 (0.5)	1.0 (0.0)	-1.41	.157	

Note. Z = Wilcoxon test when $n < 50$; *r* = effect size when using the Wilcoxon test.

Table 2
Cases depending on the level of cannabis addiction by gender

Gender	No addiction % *(n)*	Moderate addiction % *(n)*	Dependence % *(n)*
Total	30.7 (64)	58.3 (121)	11 (23)
Female	43.2 (32)	45.9 (34)	10.8 (8)
Male	23.9 (32)	64.9 (87)	11.2 (15)

Table 3
Changes in cannabis consumption during lockdown by gender and addiction level

Substance	Consumption	Total % *(n)*	Gender		Addiction Level (CAST)		
			Male % *(n)*	Female % *(n)*	No addiction n = 64 % *(n)*	Moderate addiction n = 121 % *(n)*	Dependence n = 23 % *(n)*
Marijuana spliff	Decreased	35.9 (75)	35 (47)	37.5 (28)	33.6 (21)	36.8 (45)	37.5 (9)
	Maintained	39.1 (81)	40 (54)	37.5 (28)	45.5 (29)	40.6 (49)	13.5 (3)
	Increased	25 (52)	25 (33)	25 (19)	20.9 (13)	22.6 (27)	49 (11)
Joint (marijuana cigarette)	Decreased	5.4 (11)	6.3 (8)	3.8 (3)	11.2 (7)	1.4 (2)	10.4 (2)
	Maintained	82.7 (172)	80 (107)	87.5 (65)	82.8 (53)	85.2 (103)	68.7 (16)
	Increased	11.9 (25)	13.8 (18)	8.7 (6)	6 (4)	13.4 (16)	20.8 (5)
Hashish spliff	Decreased	6.8 (14)	6.3 (8)	7.7 (6)	3.3 (2)	9.8 (12)	0
	Maintained	81.4 (169)	81.2 (109)	81.7 (61)	93.3 (60)	78.3 (95)	64.6 (15)
	Increased	11.8 (25)	12.5 (17)	10.6% (8)	3.3 (2)	11.8 (14)	35.4 (8)

Note. n = 208.

more per month, while the majority of those who did not show addiction (31.4% females and 40% males) reported a monthly consumption of one to two days. Regarding consumption during lockdown, evaluated in the last week, both females and males with moderate addiction (41.2% vs. 34.4%, respectively) and with dependence (75% vs. 42.1%, respectively), indicated using marijuana and/or hashish every day. Among those who did not show addiction to cannabis, more than half (65.4% females; 74.1% males) indicated that they had not used cannabis in the last 7 days.

Table 3 shows the complementary analysis regarding the percentage of consumers who decreased, maintained, or increased their consumption of cannabis and other derivatives for the before and during lockdown periods. In general, 25% of consumers increased their marijuana spliff consumption, 11.8% increased their consumption of hashish spliff, and 11.9% increased their use of joints.

Concerning gender (Table 3), 25% of females and males increased their average daily consumption of joints during lockdown while 35% of males and 37.5% of females decreased their overall consumption. Regarding other types of consumption, 10.6% of females increased their consumption of hashish spliff, while 13.8% of males increased their consumption of joints.

Based on the classification of levels of addiction to cannabis (CAST) (Table 3), people with dependence increased their use of all forms of cannabis to a greater extent compared to those with moderate or no addiction. Among those who showed moderate addiction, 22.6% increased their marijuana spliff consumption, and 13.4% increased their consumption of joints while 36.8% and 9.8% reduced their consumption of marijuana spliffs and hashish spliff, respectively. Regarding people without an addiction, 20.9% of the consumers increased their consumption of marijuana spliffs and 6% their use of joints while 33.6% and 11.2% reduced their consumption of marijuana spliffs and joints, respectively.

The analysis of the changes in the average daily consumption of cannabis for the before and during lockdown periods, based on the established age ranges, showed very heterogeneous results (Table 4). For all types of consumption of cannabis and derivatives, the maintenance of consumption was predominant (between 70% and 100% of consumers). The exception was found in the marijuana spliff consumption, which experienced a greater increase among the 18-44 age groups and especially in the 25-29 group.

Similarities were observed in the living situation during lockdown and the changes in the average daily consumption of cannabis and its derivatives (Table 5). The maintenance of the average daily consumption or non-consumption, depending on the type of consumption, predominates (between 80% and 100% of consumers). Likewise, the exception to this pattern is found in marijuana spliff consumption, which increased by 44.3% for those living with people other than relatives and a partner, 35.8% for those living alone, and 32% for those living with a partner. However, more than half of marijuana spliff users, who lived with their parents or other relatives, reduced their consumption.

After checking the assumptions of normality and homoscedasticity, the factorial variance analysis yielded a significant model $F(52, 211) = 2.170$; $p < .001$ with an effect size of $\eta 2 = 0.35$, such that the selected factors (gender, age and living situation) together with their interactions explain 34.8% of the variance in cannabis addiction. Regarding simple effects, only gender showed differences in the level of cannabis addiction $F(1,211) = 8.133$, $p = .005$, $\eta 2 = 0.04$, with males reporting higher addiction ($M = 6.155$, $SD = 0.371$) than females ($M = 4.367$, $SD = 0.507$). Regarding

Table 4
Changes in cannabis consumption during lockdown by age

Substance	Consumption	18-24 years % *(n)*	25-29 years % *(n)*	30-34 years % *(n)*	35-44 years % *(n)*	45-54 years % *(n)*	55-64 years % *(n)*
Marijuana spliff	Decreased	42.5 (25)	33.2 (17)	32.5 (12)	32.5 (11)	34.5 (7)	41.6 (3)
	Maintained	34.7 (20)	28 (14)	43.9 (16)	42.5 (15)	58.6 (12)	58.4 (3)
	Increased	22.7 (13)	38.8 (20)	23.6 (9)	25 (9)	6.9 (1)	0
Joint (marijuana cigarette)	Decreased	15.3 (9)	3.3 (2)	1.9 (1)	0	0	0
	Maintained	70.6 (41)	89.2 (46)	91.7 (34)	83.8 (30)	85.1 (18)	70.8 (4)
	Increased	14.1 (8)	7.5 (4)	6.4 (2)	16.2 (6)	14.9 (3)	29.2 (2)
Hashish spliff	Decreased	4.1 (2)	6.1 (3)	8.3 (3)	13.5 (5)	3.4 (1)	0
	Maintained	78.1 (45)	86 (44)	79 (30)	80.4 (28)	80.5 (17)	100 (6)
	Increased	17.8 (10)	8 (4)	12.7 (5)	6.1 (2)	16.1 (3)	0

Note. n = 208.

Table 5
Changes in cannabis consumption during lockdown byliving situation

Substance	Consumption	Living situation				
		LA % *(n)*	LF % *(n)*	LP % *(n)*	SF % *(n)*	OLS % *(n)*
Marijuana spliff	Decreased	18.9 (2)	53.6 (36)	24.5 (16)	12.6 (2)	30.5 (6)
	Maintained	45.3 (6)	33.6 (22)	43.5 (29)	43 (8)	54.9 (11)
	Increased	35.8 (5)	12.9 (9)	32 (21)	44.3 (8)	14.6 (3)
Joint (marijuana cigarette)	Decreased	0	8.6 (6)	1.1 (1)	0	15.9 (3)
	Maintained	94.4 (12)	81.8 (55)	89.2 (59)	87.4 (16)	71.9 (14)
	Increased	5.6 (1)	9.7 (6)	9.7 (6)	12.6 (2)	12.2 (2)
Hashish spliff	Decreased	0	8.2 (5)	9.3 (6)	0	0
	Maintained	100 (13)	79.6 (53)	80.9 (54)	100 (18)	81.7 (16)
	Increased	0	12.2 (8)	9.7 (6)	0	18.3 (4)

Note. LA = Living alone; LF = Living with parents or other relatives; LP = Living with a partner; SF = Sharing a flat with people who were not a partner or family; OLS = Other living situation.

Table 6
Changes in the cannabis-tobacco consumption quantity during lockdown by gender and addiction level

		No addiction		t(p)	Moderate addiction		t(p)	Dependence		t(p)
		BL M (SD)	*DL M (SD)*		*BL M (SD)*	*DL M (SD)*		*BL M (SD)*	*DL M (SD)*	
Number of spliffs with 1 gr. marijuana	Total	2.7 (3.7)	2.8 (4.2)	-0.33 (.737)	2.8 (2.0)	3.2 (3.5)	-0.84 (.407)	2.8 (2.0)	3.2 (3.5)	-0.84 (.407)
	Female	3.0 (4.6)	3.2 (5.3)	-0.36 (.715)	4.3 (4.3)	3.7 (3.8)	1.41 (.165)	3.8 (2.5)	4.8 (5.4)	-0.84 (.428)
	Male	2.3 (2.5)	2.3 (2.6)	0.00 (1.00)	4.3 (3.5)	3.7 (3.8)	**2.01 (.047)**	2.3 (1.5)	2.4 (1.8)	-0.25 (.806)
Number of spliffs with 1 gr. hashish	Total	3.4 (11.7)	2.5 (5.9)	0.65 (.51)	3.1 (2.8)	3.3 (3.9)	-0.40 (.692)	3.1 (2.8)	3.3 (3.9)	-0.40 (.692)
	Female	5.1 (15.8)	3.3 (6.9)	0.65 (.51)	2.8 (4.0)	2.7 (4.0)	0.57 (.570)	3.4 (3.6)	4.6 (5.8)	-1.07 (.320)
	Male	1.7 (4.7)	1.7 (4.7)	0	3.1 (4.1)	3.2 (4.6)	-0.07 (.939)	3.0 (2.5)	2.6 (2.4)	0.88 (.392)

Note. BL = Before lockdown; DL = During lockdown.

interactions, significant differences were found as a function of age and living situation (F (21, 211) =1.691; p = .034, η2= 0.03. In the post hoc contrasts, the differences were: a) the living alone 18-24 years group showed a higher level of cannabis addiction than the 30-34 years group, b) the levels of cannabis addiction in the 35-44 years age group, when living with their parents or families, were significantly higher than those reported by the 18-24, 25-29 and 45-54 years age groups.

Regarding the number of marijuana spliffs obtained with one gram of cannabis by levels of addiction (Table 6), statistically significant differences were only found in males with moderate addiction who reduced the number of marijuana spliffs they obtained with one gram of cannabis, $t(86) = 2.01$, $p = .047$, although the effect was small, $d = 0.15$.

Discussion

The objective of the present study was to analyze the possible changes in cannabis use patterns during the COVID-19 lockdown period, across various types of cannabis use. Changes were analyzed as a function of gender, age and cohabitation situation, analyzing whether these variables and their interaction mediated the level of cannabis addiction. And, finally, the possible changes in the number of marijuana spliffs that users obtained with one gram of marijuana, given their level of addiction. The findings allow a better understanding of the changes that occured during this period and help determine vulnerable groups whose cannabis use was negatively affected by lockdown. From a psychosocial approach, these findings have important implications at a preventive level.

The most common way to consume cannabis continues to be by smoking it (with or without tobacco) (Hindocha et al., 2016). Among its various forms of consumption, marijuana spliff consumption was preferred both before the pandemic and during lockdown, which is in line with studies in the Spanish and European population (OEDA, 2021; Pirona, Noor & Burkhart, 2015). This relationship has important implications. Tobacco use can increase the addictive potential of cannabis and possible relapse in those who intend to quit cannabis (Hindocha et al., 2015), and has worse consequences both at the addiction level and in terms of its associated physical and mental health problems (Davis, Slutske, Martin, Agrawal & Lynskey, 2019; Tucker et al., 2019). In addition, if the synergies and mutual implications between the two are ignored, the results for cessation and maintenance of abstinence will be worse (Esteban, Olano, Moreno, Pinet & Duaso, 2019).

During lockdown, there were more consumers who reduced their marijuana spliffs consumption than those who increased it. This would explain why, generally, the average daily marijuana spliff consumption was significantly reduced compared to consumption prior to the pandemic. This variation is mainly explained by males, who showed significant changes. In general terms, the average daily consumption of joints increased, since those who increased their consumption were double as many as those who reduced it. The variation in this type of consumption was significant for both genders. The same was found regarding the dual consumption of hashish spliff. Regarding age, maintenance of the average daily consumption predominates, with the exception of the marijuana spliff consumption. Marijuana spliff consumption increased for the 18-44 age groups, especially for the 25-29 group (almost four out of 10). The largest decreases were observed in the 18-24 and 55-64 age groups. All these findings could be explained by considering psychosocial variables such as unemployment, affective disorders, responsibilities with children or care of the elderly, which could be mediating the use of cannabis for both genders (Brotto et al., 2021) as well as age. Specifically, the consumption decrease of the youngest age group (18-24) can be explained, in part, because of the link to festive events (Buckner, Walukevich & Henslee, 2018). In the case of the oldest age group, between 55-64, the decrease could be explained by the greater concern for cannabis use increasing the risk of SARS-CoV-2 infection and worse outcomes of COVID-19 (Gaiha, Cheng & Halpern-Felsher, 2020).

Concerning living situation, the average daily marijuana spliff consumption increased mainly among those living with people other than relatives or a partner, followed by those who living alone and those who living with a partner. However, more than half of those who lived with their parents or other relatives reduced their consumption. This finding suggests the importance of the preventive role of the family environment.

Regarding addiction to cannabis (CAST), the findings clearly indicate that those with cannabis dependence increased their use during lockdown for all types of cannabis and derivatives to a greater extent than those with moderate or no addiction. In the moderate and no addiction subsamples, the rates of those who decreased their consumption were higher than those who increased it, except for joints in the moderately addicted group. In addition, during lockdown moderately addicted males used marijuana spliffs with a higher concentration of cannabis than before lockdown (with 1 gram of cannabis they made fewer joints), so this group increased their risk of developing dependency. These data suggest that the measures used to contain the COVID-19 pandemic could exacerbate various risk factors for the maintenance, worsening and relapse of addictive disorders (Marsden et al., 2020). For people with addiction who were in treatment during this period, lack of access to treatment and social isolation increased their vulnerability to relapse and overdose during the pandemic (Clay & Parker, 2020; Marsden et al.,

2020). Here, the European Monitoring Center for Drugs and Drug Addiction (2020) points out the relevance of low-threshold treatment and harm reduction services to continue to operate even in restricted conditions, especially when there is a risk of withdrawal or relapse. On the other hand, given the difficulties that confinement caused in therapist-user relationships, some therapeutic alternatives in the care of users with problematic cannabis use include telephone contact, videoconferencing, the reduction of barriers to access the care center as much as possible, as well as the adaptation of therapeutic interventions (Alexander, Stoller, Haffajee & Saloner, 2020; Tsai & Wilson, 2020). As Villaverde-González, Fernández-Rodríguez, San Narciso-Izquierdo & Povedano-Suárez (2020) point out, this also requires flexibility and continuous training for professionals to be able to face future situations that alter the normality of care.

In conclusion, the findings of the present study can guide the design of public policies and specific interventions that favor the maintenance of the assistance network in crisis periods similar to COVID-19 lockdown. Although men present a higher level of cannabis addiction, during the COVID-19, marijuana spliff consumption experienced a greater increase in females, the 25-29 age group, among those living with people other than relatives or a partner, alone, or with a partner. Consequently, it is important to expand studies that help to explain the causes of this phenomenon, and, at a practical level, therapeutic follow-up should be increased in women of this age. However, consumption was reduced among those living with parents. Also, the 18-24 age group living alone showed a higher level of cannabis addiction than those aged 30-34 years. This finding suggests the relevance of the family environment as a protective factor (Fuentes, Alarcón, García & Gracia, 2015). And, conversely, the 35-44 age group levels of cannabis addiction for those who live with their parents or families are significantly higher than those reported by the remaining age groups. This finding suggests the importance of analyzing not only the situation of cohabitation, but also the quality of family relationships and the possible presence of family stressors, such as difficulties in reconciling work and family life or caring for dependents. Finally, the rate of dependent consumers who increased their marijuana spliff and joint consumption is greater than users without an addiction and moderate addiction. This fact reinforces the greater vulnerability to increase consumption in those who already had a dependency on cannabis.

In short, gender, age and living situation, as well as the level of dependence, determined changes in the pattern of cannabis use during lockdown.

Among the limitations of this study, we can point out the sample size. It is a convenience sample, without random selection or stratified sampling, and so it is not possible to generalize the obtained results. Likewise, tetrahydrocannabinol (THC) levels were not considered (Chandra et al., 2019) or other forms of consumption such as hookahs, "dabbing", "cannavaping" or vaporizers (Papaseit et al., 2018). There was also no question about self-cultivation, which could be a determining factor for substance accessibility. Finally, in order to broaden the study of cannabis use risk, it is suggested that other sociodemographic, mental health and other drug use variables be included in future studies.

Acknowledgements

This study was financiated by the Valencian International University (ref. PII2020_05). The study has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki), and was approved by the Committee of Evaluation and Follow-up of Research with Human Beings (CEISH) from Valencian International University (protocol code CEID2020_02).

Conflict of interests

The authors declare that they have no conflict of interest.

References

Alexander, G. C., Stoller, K. B., Haffajee, R. L. & Saloner, B. (2020). An epidemic in the midst of a pandemic: Opioid use disorder and COVID-19. *Annals of Internal Medicine, 173*, 57-58. doi:10.7326/M20-1141.

Bartel, S. J., Sherry, S. B. & Stewart, S. H. (2021). Pandemic-related changes in alcohol and cannabis use: Comparing retrospective reports and prospective data. *International Journal of Mental Health and Addiction*, 1-7. doi:10.1007/s11469-021-00708-7.

Beach, S. R., Schulz, R., Donovan, H. & Rosland, A. M. (2021). Family caregiving during the COVID-19 pandemic. *The Gerontologist*, *61*, 650-660. doi:10.1093/geront/gnab049.

Boehnke, K. F., McAfee, J., Ackerman, J. M. & Kruger, D. J. (2021). Medication and substance use increases among people using cannabis medically during the COVID-19 pandemic. *International Journal of Drug Policy*, *92*, 103053. doi:10.1016/j.drugpo.2020.103053.

Bollen, Z., Pabst, A., Creupelandt, C., Fontesse, S., Lannoy, S., Pinon, N. & Maurage, P. (2021). Prior drinking motives predict alcohol consumption during the COVID-19 lockdown: A cross-sectional online survey among belgian college students. *Addictive Behaviors*, *115*, 106772. doi:10.1016/j.addbeh.2020.106772.

Brotto, L. A., Chankasingh, K., Baaske, A., Albert, A., Booth, A., Kaida, A.,… Galea, L. (2021). The influence of sex, gender, age, and ethnicity on psychosocial factors and substance use throughout phases of the COVID-19

pandemic. *PloS One*, *16*, e0259676. doi:10.1371/journal.pone.0259676.

Buckner, J. D., Walukevich, K. A. & Henslee, A. M. (2018). Event-specific cannabis use and cannabis use motives. *Substance Use and Misuse, 53*, 1093-1098. doi:10.1080/10826084.2017.1399142.

Chandra, S., Radwan, M. M., Majumdar, C. G., Church, J. C., Freeman, T. P. & ElSohly, M. A. (2019). New trends in cannabis potency in USA and Europe during the last decade (2008- 2017). *European Archives of Psychiatry and Clinical Neuroscience*, *269*, 5-15. doi:10.1007/s00406-019-00983-5.

Cherkasova, M. (2020). Addiction in the times of pandemic. *The Canadian Journal of Addiction, 11*, 9-12 doi:10.1097/CXA.0000000000000082.

Clay, J. M. & Parker, M. O. (2020). Alcohol use and misuse during the COVID-19 pandemic: A potential public health crisis? *The Lancet Public Health*, *5*, e259. doi:10.1016/S2468-2667(20)30088-8.

Cuenca-Royo, A. M., Sánchez-Niubó, A., Forero, C. G., Torrens, M., Suelves, J. M. & Domingo-Salvany, A. (2012). Psychometric properties of the CAST and SDS scales in young adult cannabis users. *Addictive Behaviors*, *37*, 709-715. doi:10.1016/j.addbeh.2012.02.012.

Davis, C. N., Slutske, W. S., Martin, N. G., Agrawal, A. & Lynskey, M. T. (2019). Identifying subtypes of cannabis users based on simultaneous polysubstance use. *Drug and Alcohol Dependence*, *205*, 107696. doi:10.1016/j.drugalcdep.2019.107696.

EMCDDA (2020). *Impact of COVID-19 on patterns of drug use and drug-related harms in Europe*. Publications Office of the European Union, Luxembourg. https://www.emcdda.europa.eu/system/files/publications/13130/EMCDDA-Trendspotter-Covid-19-Wave-2_1.pdf.

EMCDDA & Europol (2020). *EU drug markets: Impact of COVID-19*. Publications Office of the European Union, Luxembourg. https://www.emcdda.europa.eu/publications/joint-publications/eu-drug-markets-impact-of-covid-19_en.

Esteban, A., Olano, E., Moreno, J. J., Pinet, M. C. & Duaso, M. J. (2019). Revisión del tratamiento del uso conjunto del tabaco y del cannabis. *Informació Psicológica, 117*, 58-70. doi:10.14635/IPSIC.2019.117.6.

Fischer, B., Russell, C., Sabioni, P., Van Den Brink, W., Le Foll, B., Hall, W.,… Room, R. (2017). Lower-risk cannabis use guidelines: A comprehensive update of evidence and recommendations. *American Journal of Public Health*, *107*, 1-12. doi:10.2105/AJPH.2017.303818.

Fuentes, M. C., Alarcón, A., García, F. & Gracia, E. (2015). Consumo de alcohol, tabaco, cannabis y otras drogas en la adolescencia: Efectos de la familia y el barrio. *Annals of Psychology*, *31*, 1000-1007. doi:10.6018/analesps.31.3.183491.

Gaiha, S. M., Cheng, J. & Halpern-Felsher, B. (2020). Association between youth smoking, electronic cigarette use, and COVID-19. *Journal of Adolescent Health*, *67*, 519-523. doi:10.1016/j.jadohealth.2020.07.002.

Giurge, L. M., Whillans, A. V. & Yemiscigil, A. (2021). A multicountry perspective on gender differences in time use during COVID-19. *Proceedings of the National Academy of Sciences*, *118*, e2018494118. doi:10.1073/pnas.2018494118.

Graupensperger, S., Fleming, C. B., Jaffe, A. E., Rhew, I. C., Patrick, M. E. & Lee, C. M. (2021). Changes in young adults' alcohol and marijuana use, norms, and motives from before to during the COVID-19 pandemic. *Journal of Adolescent Health*, *68*, 658-665. doi:10.1016/j.jadohealth.2021.01.008.

Hindocha, C., Freeman, T. P., Ferris, J. A., Lynskey, M. T. & Winstock, A. R. (2016). No smoke without tobacco: A global overview of cannabis and tobacco routes of administration and their association with intention to quit. *Frontiers in Psychiatry*, *7*, 104. doi:10.3389/fpsyt.2016.00104.

Hindocha, C., Shaban, N. D. C., Freeman, T. P., Das, R. K., Gale, G., Schafer, G.,… Curran, H. V. (2015). Associations between cigarette smoking and cannabis dependence: A longitudinal study of young cannabis users in the United Kingdom. *Drug and Alcohol Dependence*, *148*, 165-171. doi:10.1016/j.drugalcdep.2015.01.004.

Instituto Nacional de Estadística (2019). *Encuesta sobre Equipamiento y Uso de Tecnologías de Información y Comunicación en los Hogares*. https://www.ine.es/ss/Satellite?L=es_

Isorna, M., Villanueva-Blasco, V. J., Veiga, S. & Otero-Requeijo, M. (2020). El cannabis y sus derivados: Formas de presentación, características y aspectos esenciales. In M. Isorna, V. J. Villanueva-Blasco & A. Rial (Eds.), *Cannabis: evidencia científica vs. controversia social* (pp. 27-57). Madrid: Dykinson. doi:10.2307/j.ctv1ks0g4c.6.

Klempova, D., Sánchez, A., Vicente, J., Barrio, G., Domingo, A., Suelves, J. M. & Ramirez, V. (2009). *Consumo problemático de cannabis en estudiantes españoles de 14-18 años: Validación de escalas*. Estudio colaborativo entre la Delegación del Gobierno para el Plan Nacional sobre Drogas y el Observatorio Europeo de las Drogas y las Toxicomanías. Madrid: Ministerio de Sanidad y Política Social.

Lee, S. J., Ward, K. P., Chang, O. D. & Downing, K. M. (2021). Parenting activities and the transition to home-based education during the COVID-19 pandemic. *Children and Youth Services Review*, *122*, 105585. doi:10.1016/j.childyouth.2020.105585.

Legleye, S., Karila, L., Beck, F. & Reynaud, M. (2007). Validation of the CAST, a general population Cannabis Abuse Screening Test. *Journal of Substance Use*, *12*, 233-242. doi:10.1080/14659890701476532.

Ley de protección de datos personales y garantía de derechos digitales, del 5 de diciembre. *Boletín Oficial del estado, 294*, del 6 de diciembre de 2018. https://www.boe.es/eli/es/lo/2018/12/05/3.

Marsden, J., Darke, S., Hall, W., Hickman, M., Holmes, J., Humphreys, K.,… West, R. (2020). Mitigating and learning from the impact of COVID-19 infection on addictive disorders. *Addiction, 115*, 1007-1010. doi:10.1111/add.15080.

Observatorio Español de las Drogas y las Adicciones (2021*). Informe 2021. Alcohol, tabaco y drogas ilegales en España.* Madrid: Ministerio de Sanidad y Política Social. Delegación del Gobierno para el Plan Nacional sobre Drogas.

Observatorio Europeo de las Drogas y las Toxicomanías (2020). *Información actualizada del EMCDDA sobre las implicaciones del COVID-19 para los consumidores de drogas y proveedores de servicios para drogodependientes*. https://www.emcdda.europa.eu/publications/topic-overviews/covid-19-and-people-who-use-drugs_es.

Papaseit, E., Pérez-Mañá, C., Pérez-Acevedo, A. P., Hladun, O., Torres-Moreno, M. C., Muga, R.,... Farré, M. (2018). Cannabinoids: From pot to lab. *International Journal of Medical Sciences*, *15*, 1286-1295. doi:10.7150/ijms.27087.

Pirona, A., Noor, A. & Burkhart, G. (2015). *Tobacco in cannabis joints: Why are we ignoring it?*. Poster presented at the European Monitoring Centre for Drugs and Drug Addiction. Lisbon. https://www.emcdda.europa.eu/publications/posters/2015/tobacco-in-cannabis-joints_en.

Plan Nacional sobre Drogas (2020). *EDADES Informe 2019. Alcohol, tabaco y otras drogas ilegales en España*. Madrid: Ministerio de Sanidad y Política Social. www.pnsd.mscbs.gob.es/profesionales/sistemasInformacion/sistemaInformacion/pdf/2019_Informe_EDADES.pdf.

Rolland, B., Haesebaert, F., Zante, E., Benyamina, A., Haesebaert, J. & Franck, N. (2020). Global changes and factors of increase in caloric/salty food intake, screen use, and substance use during the early COVID-19 containment phase in the general population in France: Survey study. *JMIR Public Health and Surveillance*, *6*, e19630. doi:10.2196/19630.

Richter, L., Pugh, B. S. & Ball, S. A. (2016). Assessing the risk of marijuana use disorder among adolescents and adults who use marijuana. *The American Journal of Drug and Alcohol Abuse*, *43*, 247-260. doi:10.3109/00952990.2016.1164711.

Russell, B. S., Hutchison, M., Tambling, R., Tomkunas, A. J. & Horton, A. L. (2020). Initial challenges of caregiving during COVID-19: Caregiver burden, mental health, and the parent–child relationship. *Child Psychiatry & Human Development*, *51*, 671-682. doi:10.1007/s10578-020-01037-x.

Schauer, G. L. & Peters, E. N. (2018). Correlates and trends in youth co-use of marijuana and tobacco in the United States, 2005-2014. *Drug and Alcohol Dependence, 185*, 238-244. doi:10.1016/j.drugalcdep.2017.12.007.

Tsai, J. & Wilson, M. (2020). COVID-19: A potential public health problem for homeless populations. *The Lancet Public Health, 5*, 186-187. doi:10.1016/S2468-2667(20)30053-0.

Tucker, J. S., Pedersen, E. R., Seelam, R., Dunbar, M. S., Shih, R. A. & D'Amico, E. J. (2019). Types of cannabis and tobacco/nicotine co-use and associated outcomes in young adulthood. *Psychology of Addictive Behaviors, 33*, 401-411. doi:10.1037/adb0000464.

Vanderbruggen, N., Matthys, F., Van Laere, S., Zeeuws, D., Santermans, L., Van den Ameele, S. & Crunelle, C. L. (2020). Self-reported alcohol, tobacco, and cannabis use during COVID-19 lockdown measures: Results from a web-based survey. *European Addiction Research, 26*, 309-315. doi:10.1159/000510822.

Van Laar, M. W., Oomen, P. E., Van Miltenburg, C. J., Vercoulen, E., Freeman, T. P. & Hall, W. D. (2020). Cannabis and COVID-19: Reasons for concern. *Frontiers in Psychiatry*, *11*, 601653. doi:10.3389/fpsyt.2020.601653.

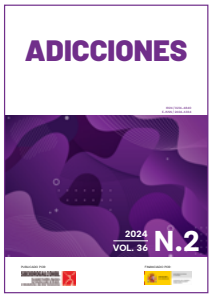
Villanueva-Blasco, V. J., Villanueva-Silvestre, V., Vázquez-Martínez, A., Rial, A. & Isorna, M. (2021). Age and living situation as key factors in understanding changes in alcohol use during COVID-19 confinement. *International Journal of Environmental Research and Public Health*, *18*, 11471. doi:10.3390/ijerph182111471.

Villaverde-González, A., Fernández-Rodríguez, M., San Narciso-Izquierdo, G. & Povedano-Suárez, E.A. (2020). Adicciones durante el confinamiento por el Covid-19 en Asturias. *Psicosomática y Psiquiatría, 15*, 21-27. doi:10.34810/PsicosomPsiquiatrnum1504.

Zamarro, G. & Prados, M. J. (2021). Gender differences in couples' division of childcare, work and mental health during COVID-19. *Review of Economics of the Household*, *19*, 11-40. doi:10.1007/s11150-020-09534-7.

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

ADICCIONES
2024 ■ VOL. 36 ■ N. 2 ■ PAGES 227–236
www.adicciones.es



ORIGINAL

Impact of alcohol control policy on hemorrhagic and ischemic stroke mortality rates in Lithuania: An interrupted time series analysis

Impacto de políticas de control de alcohol en las tasas de mortalidad por ictus hemorrágico e isquémico en Lituania: Análisis de series temporales interrumpidas

Kawon Victoria Kim *,**, Jürgen Rehm *, **, ***, ****, *****, ******, *******, ********, Xinyang Feng *, **, Huan Jiang *, **, Jakob Manthey *******, *********, Ričardas Radišauskas**********, **********, Mindaugas Štelemėkas **********, **********, Alexander Tran *, Anush Zafar *, Shannon Lange *, ***, *****.

* Institute for Mental Health Policy Research, Centre for Addiction and Mental Health, Toronto ON, Canadá. ** Dalla Lana School of Public Health, University of Toronto, Toronto ON, Canadá. *** Campbell Family Mental Health Research Institute, Centre for Addiction and Mental Health, Toronto ON, Canadá. **** Institute of Clinical Psychology and Psychotherapy, Technische Universität Dresden, Dresden, Alemania. ****** Department of Psychiatry, University of Toronto, Toronto ON, Canadá. ******* Institute of Medical Science, University of Toronto, Toronto ON, Canadá. ******** Center for Interdisciplinary Addiction Research, Department of Psychiatry and Psychotherapy, University Medical Center Hamburg-Eppendorf, Hamburgo, Alemania. ********* Department of International Health Projects, Institute for Leadership and Health Management, I.M. Sechenov First Moscow State Medical University, Moscú, Federación Rusa. ********** Department of Psychiatry, Medical Faculty, University of Leipzig, Leipzig, Alemania. ********** Department of Environmental and Occupational Medicine, Faculty of Public Health, Lithuanian University of Health Sciences, 47181 Kaunas, Lituania. ********** Institute of Cardiology, Lithuanian University of Health Sciences, 50162 Kaunas, Lituania. ********** Health Research Institute, Faculty of Public Health, Lithuanian University of Health Sciences, 47181 Kaunas, Lituania. ********** Department of Preventive Medicine, Faculty of Public Health, Lithuanian University of Health Sciences, 47181 Kaunas, Lituania.

Abstract

Given the causal impact of alcohol use on stroke, alcohol control policies should presumably reduce stroke mortality rates. This study aimed to test the impact of three major Lithuanian alcohol control policies implemented in 2008, 2017 and 2018 on sex- and stroke subtype-specific mortality rates, among individuals 15+ years-old. Joinpoint regression analyses were performed for each sex- and stroke subtype-specific group to identify timepoints corresponding with significant changes in mortality rate trends. To estimate the impact of each policy, interrupted time series analyses using a generalized additive mixed model were performed on monthly sex- and stroke subtype-specific age-standardized mortality rates from January 2001-December 2018. Significant average annual percent decreases were found for all sex- and stroke subtype-specific mortality rate trends. The alcohol control policies were most impactful on ischemic stroke mortality rates among women. The 2008 policy was followed by a positive level change of 4,498 ischemic stroke deaths per 100,000 women and a negative monthly slope change of -0.048 ischemic stroke deaths per 100,000 women. Both the 2017 and 2018 policy enactment timepoints coincided with a significant negative level change for ischemic stroke mortality rates among women, at -0.901 deaths and -1.431 deaths per 100,000 population, respectively. Hemorrhagic stroke mortality among men was not affected by any of the policies, and hemorrhagic stroke mortality among women and ischemic stroke mortality among men were only associated with the 2008 policy. Our study findings suggest that the impact of alcohol control policies on stroke mortality may vary by sex and subtype.
Keywords: alcohol, stroke, mortality, health policy, Lithuania

Resumen

Dado el impacto del alcohol en los ictus, las políticas de control de alcohol deberían reducir las tasas de mortalidad. Nuestro objetivo fue demostrar el impacto de tres importantes políticas lituanas implementadas en 2008, 2017 y 2018 en las tasas de mortalidad específicas por subtipo de ictus y sexo, en mayores de 15 años. Se realizaron análisis de regresión «joinpoint» para identificar los cambios de tendencia. Para estimar el impacto, se realizaron análisis de series temporales interrumpidas utilizando un modelo mixto aditivo generalizado en las tasas mensuales estandarizadas por edad, desde enero 2001 hasta diciembre 2018. Se encontraron disminuciones porcentuales anuales promedio significativas en ambos subtipos de ictus y por sexo. Las políticas tuvieron un mayor impacto en las tasas de mortalidad por ictus isquémico en mujeres. Posterior a la política del 2008, ocurrió un cambio positivo de 4,498 muertes por ictus isquémico por 100 000 mujeres y un cambio de pendiente mensual negativo de -0,048 muertes por ictus isquémico por 100 000 mujeres. Posterior a las políticas de 2017 y 2018, hubo un cambio de tendencia negativo significativo para la mortalidad por ictus isquémico en mujeres, de -0.901 muertes y -1.431 muertes por 100 000 habitantes, respectivamente. La mortalidad por ictus hemorrágico en hombres no se vio afectada, y la mortalidad por ictus hemorrágico en mujeres y por ictus isquémico en hombres solo se vio afectada por la política del 2008. Nuestros hallazgos sugieren que el impacto de las políticas en la mortalidad por ictus puede variar según sexo y subtipo.
Palabras clave: alcohol, ictus, mortalidad, política sanitaria, Lituania

■ *Received: May 2022; Accepted: October 2022.*

■ ISSN: 0214-4840 / E-ISSN: 2604-6334

■ **Send correspondence to:**
Shannon Lange, MPH, PhD. Institute for Mental Health Policy Research, Centre for Addiction and Mental Health. 33 Ursula Franklin St., Room T521, Toronto, Ontario, M5S 2S1. Tel: 416-535-8501 ext. 34512; Email: shannon.lange@camh.ca

Hemorrhagic and ischemic stroke are cardiovascular diseases caused by reduced blood supply to the brain and are among the most important disease categories causally affected by alcohol (Rehm et al., 2017). Age-standardized stroke mortality rates per 100,000 population have declined globally between 1990 and 2019, but stroke has remained the second greatest specific cause of death worldwide (GBD 2019 Stroke Collaborators, 2021). Specifically, age-standardized stroke mortality rates within Central Europe, Eastern Europe, and Central Asia have fluctuated around 200 deaths per 100,000 population between 1990 and 2002, followed by a decrease from approximately 205 deaths per 100,000 population to 120 deaths per 100,000 population between 2002 and 2017, and have plateaued at around 120 deaths per 100,000 population between 2017 and 2019 (GBD 2019 Stroke Collaborators, 2021). While the relationship between alcohol consumption and stroke subtype-specific mortality risk is complex, excessive alcohol consumption is associated with an increased risk of mortality for both stroke subtypes (O'Donnell et al., 2016; Patra et al., 2010). A meta-analysis by Patra and colleagues (2010) found that the risk for hemorrhagic stroke for men and women who drank more than 12g of pure alcohol per day was 1.3- and 1.5-times greater, respectively, than that of lifetime abstainers, and that the risk for ischemic stroke among men and women who drank more than 36g of pure alcohol per day was 1.2- and 1.4-times greater, respectively.

Despite being the only World Health Organization (WHO) region to report a decrease in total alcohol per capita consumption in the most recent Global Status Report (from 12.1 litres in 2000 to 9.8 litres in 2016), the European Region has consistently ranked the highest globally for alcohol consumption levels (World Health Organization, 2018). In addition, the highest alcohol-attributable mortality rates have been reported among certain Eastern European countries including Lithuania, where it was found to be 163.7 deaths per 100,000 population in 2016 (Shield et al., 2020). In an attempt to reduce alcohol-related harms, various alcohol control policies have been introduced in Lithuania since 2008 (Miščikienė et al., 2020), including the WHO's "best buys" – i.e., alcohol control policies that are evidence-based and highly cost effective (Chisholm et al., 2018; World Health Organization, 2017). Among the various policies implemented, the policies enacted in January 2008, March 2017, and January 2018, encompassed either a price increase, reduced availability of alcohol, or both (Miščikienė et al., 2020). These policies are believed to have had an immediate effect on alcohol consumption, thereby immediately reducing attributable harms (Rehm et al., 2021). In fact, Lhachimi et al. (2012) analyzed alcohol consumption data from 11 European Union-member states to model the effects of increased alcohol prices on stroke mortality and estimated that approximately 65,800 less men and 23,500 less women would experience a stroke over a ten-year period if all 11 countries were to increase the price of alcohol to that of Finland's, where at the time of the study, the price level index of alcohol was the highest within the European Union. However, to the best of our knowledge, there is currently no study that has empirically examined the impact of alcohol control policies on stroke mortality rates by subtype (i.e., hemorrhagic and ischemic stroke).

It is reasonable to hypothesize that the impact of alcohol control policies may differ by stroke subtype and sex, as the shape of the dose-response curves for alcohol consumption and the relative risks of hemorrhagic and ischemic stroke mortality appear to be sex specific. Specifically, there exists a linearly increasing dose-response relationship among men who drink any level of alcohol, so that they are at an increased relative risk of hemorrhagic stroke mortality compared to lifetime abstainers (Patra et al., 2010). On the other hand, hemorrhagic stroke mortality among women and ischemic stroke mortality for both men and women present a J-shaped dose-response curve, meaning that low-to-moderate levels of alcohol consumption have been associated with a protective effect against mortality risk while high consumption levels can cause harm (Patra et al., 2010). If alcohol control policies reduce consumption levels across the population and especially among heavy drinkers (Chisholm et al., 2018), the proportion of heavy drinkers in the population would decrease while the proportion low-to-moderate drinkers would increase. This increase in the population proportion of low-to-moderate drinkers may reduce stroke mortality differently among J-shaped and linear dose-response relationships. That is, the consequent increase in the proportion of low to moderate drinkers within a J-shaped dose-response relationship may increase the population proportion with lower risk for stroke mortality and thus decrease stroke mortality rates, while in the context of a linear dose-response relationship, the increased proportion of low to moderate drinkers would still possess a higher relative risk of mortality compared to lifetime abstainers resulting in less of a change. Therefore, in the current paper, we aimed to investigate the impact of the 2008, 2017 and 2018 alcohol control policies implemented in Lithuania on sex-specific hemorrhagic and ischemic mortality rates. We tested the hypothesis that the respective alcohol control policy enactments resulted in a reduction in both hemorrhagic stroke and ischemic stroke mortality rates, but that relatively greater reductions would be found for J-shaped dose-response relationships compared to linear dose-response relationships.

Method

Measures

The mortality diagnoses included in this analysis were hemorrhagic stroke (International Classification of Diseases, 10th revision [ICD-10] codes: I60-I62.9, I67.0-I67.1, I69.0-I69.298) and ischemic stroke (ICD-10 codes: G45-G46.8, I63-I63.9, I65-I66.9, I67.2-I67.848, I69.3), according to the Institute for Health Metrics and Evaluation Global Burden of Disease Study 2019 definitions (IHME, 2020). The response variables in the current study were age-standardized sex- and stroke subtype-specific mortality rates per 100,000 population. The monthly number of deaths by stroke subtype and yearly population data from 2001 to 2018 were obtained from the Lithuanian Department of Statistics (Lithuanian Department of Statistics, n.d.) and the Lithuanian University of Health Sciences to calculate monthly sex- and stroke subtype-specific crude mortality rates per 100,000 population from January 2001 to December 2018, for a total of 216 monthly data points. Yearly population data was linearly interpolated to obtain monthly data. The crude mortality rates were determined by dividing the total number of deaths among individuals aged 15+ years of age by the respective population size. This value was then multiplied by 100,000 to obtain the crude mortality rate per 100,000 population. Finally, the sex- and stroke subtype-specific crude mortality rates were directly standardized to the 2011 to 2030 European standard population (Eurostat, 2013).

As specified above, the three policies tested were implemented on January 1, 2008 (Policy 1), March 1, 2017 (Policy 2) and January 1, 2018 (Policy 3), and have been previously described as policies likely to have an immediate impact on alcohol consumption and thus, alcohol-attributable harms (Rehm et al., 2021). For specific details on the policies see the paper by Miščikienė et al. (2020). The policy enactments were coded as dummy variables with values ranging from 0 to 1, according to the lag structure described in the following paragraph.

Lag effect of alcohol control policy on stroke mortality

In setting up time-series models for chronic disease conditions, there is always the question of whether a lag-time should be modelled between, in this case, the change in alcohol consumption and the potential change in chronic disease. While chronic diseases often develop over time, changes in alcohol consumption on the population level may have immediate effects. Take liver cirrhosis as an example, where abrupt changes in availability of alcohol had almost immediate effects on liver cirrhosis mortality (e.g., the Gorbachev reform, prohibition, or the German invasion of Paris; see (Zatoński et al., 2010)). For stroke, the lag-time in times series analyses has been handled similarly, with most or all of the effects being modelled immediately after a change of consumption (Lee, Liao, Peng & Lin, 2019; Pun et al., 2013; Razvodovsky, 2014). While Pun et al. (2013) did not explicitly test for any lag structure, Lee et al. (2019) and Razvodovsky (2014) tested different lag structures.

Given that both types of stroke are chronic diseases with some excepted lag effects (Holmes, Meier, Booth, Guo & Brennan, 2012) and that the stroke mortality data reflects population-level observations, we incorporated a lag structure into the time-series analyses to ensure the full effect was captured. Specifically, the cumulative geometric distribution structure of the lag structure was equal to

$$F(X = k) = 1 - (1 - p)^{k+1}$$

where p = 20% is the probability that the policy was effective in each month, and F (X = k) is the probability that the policy was effective after k months (Devroye, 1986). This resulted in a lag structure that had a 20% probability of an immediate effect, 36% after 1 month, 49% after 2 months, and approximately 100% at 24 months. The shape of the cumulative geometric distribution was taken from Holmes and colleagues (Holmes et al., 2012), and the overall lag-time of 24 months was based on an overall integration of the literature (Holmes et al., 2012; Lee et al., 2019; Pun et al., 2013; Razvodovsky, 2014), which tended to indicate relative short lag times (see (Razvodovsky, 2014) for a test of different lag-times).

Covariates

The underlying mechanisms of alcohol attributable harms are complex and are believed to be partly driven by economic factors that reflect the price and affordability of alcohol (Schmidt, Mäkelä, Rehm & Room, 2010; Stuckler, Meissner & King, 2008). Therefore, additional covariates, including gross domestic product *per capita* (GDP), consumer price index of alcoholic beverages compared to the December of the previous year (CPI), and sex-specific unemployment rates were considered for inclusion in the final model. Quarterly GDP, monthly CPI and monthly unemployment rate data were obtained from the Lithuanian Department of Statistics (Lithuanian Department of Statistics, 2020a, 2020b, 2021). Quarterly values were linearly interpolated to obtain monthly data.

Statistical analysis

Joinpoint regression analysis

The joinpoint regression is a segmented regression technique which identifies points of inflection in the data, fits linear segments between the identified inflection points and estimates changes in slope across a time series (i.e., annual percent change (APC) and average APC (AAPC)). Using the grid-search method and a permutation test procedure, the fewest number of linear segments such that an additional joinpoint does not add a statistically

significant linear trend is selected. The maximum number of joinpoints was set at five, which is standard for joinpoint analyses of 30 or more data points (Kim, Fay, Feuer & Midthune, 2000). The joinpoint regression analyses were conducted using the Joinpoint Regression Program version 4.8.0.1 (Statistical Methodology and Applications Branch, Surveillance Research Program, 2020).

Interrupted time series analysis using generalized additive mixed models (GAMM)

To test the hypothesis that the three policy enactments had a relatively greater impact on reducing sex-specific hemorrhagic stroke mortality than ischemic stroke mortality, an interrupted time series analysis using a generalized additive mixed model (GAMM) (Beard et al., 2019) was performed for each policy, in RStudio version 1.3.1073 (RStudio Team, 2020). Seasonality of the sex- and stroke subtype-specific mortality rates were accounted for in the GAMMs by the inclusion of a smoothing spline with 12 knots, to reflect each month. The correlation matrices and cross correlation functions between the sex- and stroke subtype-specific mortality rates and each covariate (i.e., GDP, CPI and sex-specific unemployment rates) were assessed to identify any significant lagged relationships. Analysis of variance (ANOVA) testing was performed at a 0.05 alpha level to determine the inclusion of an interaction term between the linear time variable (i.e., months variable) and the lagged policy effect, as well as to determine the inclusion of a quadratic effect of the months variable. The number of autoregressive (AR) and moving average (MA) terms of each sex- and stroke subtype-specific GAMM was determined using the auto.arima function from the forecast package in R and confirmed by examination of their respective autocorrelation function (ACF) and partial autocorrelation function (PACF) plots. AR and MA terms were included in the final model when it resulted in a better model fit, as indicated by greater R^2, and lower AIC or BIC values. Finally, the Shapiro-Wilk test (Shapiro & Wilk, 1965) and Q-Q plots were used to assess residual normality, and residual plots against linear predicted values were assessed to determine stationarity.

A *p*-value less than 0.05 was considered statistically significant for all analyses. The protocol for this study was registered to Open Science Framework Preregistration (DOI: 10.17605/OSF.IO/4MXCZ, submitted May 28, 2021).

Results

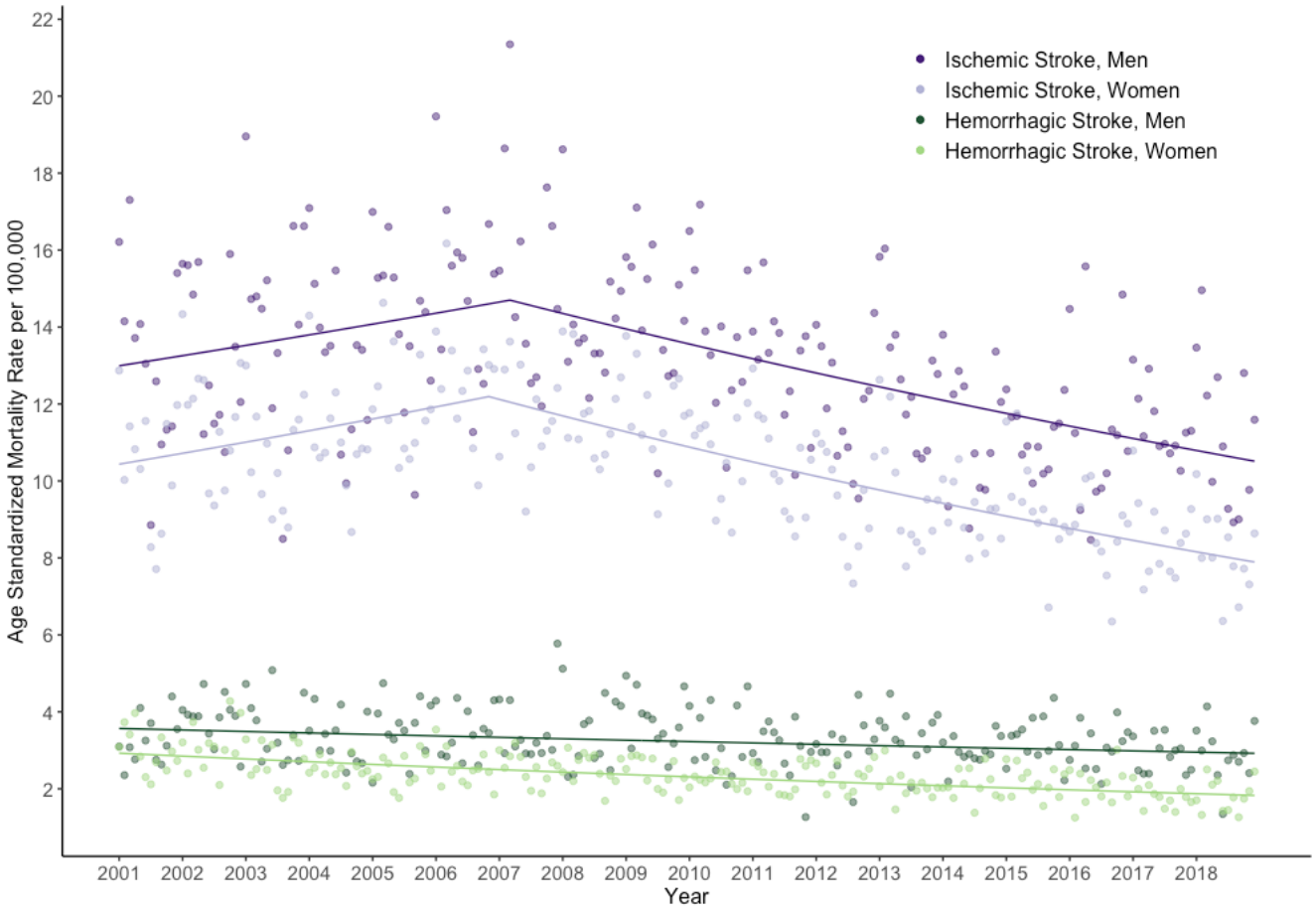
Joinpoint regression analysis

Overall, the age-standardized ischemic stroke mortality rates for both men and women were greater than that of hemorrhagic stroke, and stroke subtype-specific mortality rates among women were lower than those for men (Fig 1). The joinpoint regression analyses revealed that age-standardized mortality rates for both hemorrhagic and ischemic stroke significantly decreased between January 2001 and December 2018 among both sexes, with a greater rate of decline observed among women compared to men (Table 1). The AAPC for hemorrhagic and ischemic stroke mortality rate among men were -0.09% (95% confidence interval (CI): -0.14%, -0.05%; $p < 0.001$) and -0.10% (95% CI: -0.18%, -0.01%; $p = 0.02$), respectively. Whereas the hemorrhagic and ischemic stroke mortality rate AAPC among women were -0.22% (95% CI: -0.26%, -0.18%; $p < 0.001$) and -0.13% (95% CI: -0.21%, -0.05%; $p < 0.001$), respectively. No significant joinpoints were identified for hemorrhagic stroke mortality rates for either sex. However, one significant joinpoint was identified for ischemic stroke mortality rates for both men and women, in March 2007 and November 2006, respectively (Fig 1). The ischemic stroke mortality rate APC among men was 0.17% (95% CI: -0.03%, 0.37%; $p = 0.10$) until March 2007, after which the mortality rate significantly decreased each year by -0.24% (95% CI: -0.31%, -0.16%; $p < 0.001$). Similarly, the ischemic stroke mortality rate APC among women was 0.22% (95% CI: 0.03%, 0.42%; $p = 0.02$) up to November 2006, after which the mortality rate significantly decreased each year by -0.30% (95% CI: -0.36%, -0.23%; $p < 0.001$).

Interrupted times series analysis results for sex-specific hemorrhagic stroke mortality rates

The R^2 values for all the sex-specific hemorrhagic stroke mortality GAMMs were low, indicating a poor model fit (Table 2) and that other unknown factors are likely impacting the sex-specific hemorrhagic stroke mortality rate. None of the tested policies were found to have a significant effect on hemorrhagic stroke mortality rates among men, while Policy 1 was the only policy to have a significant effect among women. Specifically, the full effect of Policy 1 was associated with a slope change for hemorrhagic stroke mortality rates among women. The "months" term (ß = -0.016; 95% CI: -0.024, -0.008; $p < 0.001$) and interaction term (months*policy effect; ß = 0.007; 95% CI: 0.001, 0.013; $p = 0.020$) were found to be significant, and the coefficients of these two variables can be added to calculate the slope of hemorrhagic stroke mortality 24 months after Policy 1 enactment (i.e., timepoint at which the policy is assumed to have full effect); this was equal to a monthly decrease of -0.009 hemorrhagic stroke deaths per 100,000 population among women once Policy 1 was in full effect. Therefore, within the limitations of a low R^2 value for this model ($R^2 = 0.434$), it can be inferred that as compared to a monthly decrease of -0.016 deaths per 100,000 population prior to policy enactment, the full effect of Policy 1 coincided with a reduced rate of decline for hemorrhagic stroke mortality among women.

Figure 1
Age-standardized sex-specific hemorrhagic stroke (green) and ischemic stroke (purple) mortality rates and joinpoint trends in Lithuania among 15+ year-olds, from January 2001 to December 2018



Interrupted times series analysis results for sex-specific ischemic stroke mortality rates

Policy 1 was the only policy to have a significant effect on ischemic stroke mortality rates among men, while all three policies had a significant effect among women (Table 3). In the Policy 1 model for men, the "months" term (ß = 0.031; 95% CI: 0.003, 0.060; $p < 0.033$) and interaction term (months*policy effect; ß = -0.054; 95% CI: -0.075, -0.033; $p < 0.001$) were found to be significant. This indicated that the ischemic stroke mortality rate increased up until the enactment of Policy 1 and the rate of the increase began to decrease after Policy 1 enactment.

In the Policy 1 model for women, ischemic stroke mortality rates were stable prior to Policy 1 enactment, followed by a positive level change at the timepoint of Policy 1 enactment and a negative slope change after the policy reached its full effect. The policy effect (ß = 4.498; 95% CI: 3.163, 5.833; $p < 0.001$) and the interaction term (months*policy effect; ß = -0.048; 95% CI: -0.063, -0.032; $p < 0.001$) were significant, representing a positive level change (i.e., an immediate increase in ischemic stroke mortality rate after the policy 1 enactment timepoint) followed by a significant declining trend for ischemic stroke mortality rates among women. The coefficients for the policy effect and interaction term can be added to calculate the ischemic stroke mortality rate when the policy reached its full effect (that is, 24 months after its enactment). This would result in an ischemic stroke mortality rate equal to 3.35 (4.498 – 0.048*24) deaths per 100,000 population on January 1, 2010, followed by a monthly rate decrease of -0.048 for each month thereafter.

The months and policy effect terms were significant in both the Policy 2 model and Policy 3 model for ischemic stroke mortality rates among women. For Policy 2, the months term (ß = -0.030; 95% CI: -0.039, -0.022; $p < 0.001$) and policy effect term (ß = -0.901; 95%. CI: -1.715, -0.088; $p = 0.031$) were significant, indicating that ischemic mortality rates among women declined at a monthly rate of -0.030 deaths per 100,000 population from 2001 to 2018, with a significant negative level change of -0.901 deaths per 100,000 population once Policy 2 reached its full effect. For Policy 3, the months term (ß = -0.033; 95% CI: -0.041, -0.025; $p < 0.001$) and policy effect term (ß = -1.431; 95% CI: -2.609, -0.252; $p = 0.018$) were significant,

Table 1
Joinpoint analysis of age-standardized[a] hemorrhagic and ischemic stroke mortality rates (per 100,000 population) from 2001-2018, by sex

	Mortality Rate per 100,000 (Date)[a]				Period 1			Period 2		
	Min.	Max.	AAPC (95% CI)	*p*	Date	APC (95% CI)	*p*	Date	CPA IC 95%	*p*
Hemorrhagic stroke										
Men	1.27 (Nov. 2011)	5.77 (Dec. 2007)	-0.09 * (-0.14, -0.05)	<0.001	Jan. 2001 – Dec. 2018	0.09* (-0.14, -0.05)	<0.001	n/a	n/a	n/a
Women	1.25 (Feb. 2016)	4.28 (Oct. 2002)	-0.22* (-0.26, -0.18)	<0.001	Jan. 2001 – Dec. 2018	-0.22* (-0.26, -0.18)	<0.001	n/a	n/a	n/a
Ischemic stroke										
Men	8.47 (May 2016)	21.35 (Mar. 2007)	-0.10* (-0.18, -0.01)	0.02	Jan. 2001 – Mar. 2007	0.17 (-0.03, 0.37)	0.10	Mar. 2007 – Dec. 2018	-0.24* (-0.31, -0.16)	<0.001
Women	6.35 (Sep. 2016)	16.17 (Mar. 2006)	0.13* (-0.21, -0.05)	<0.001	Jan. 2001 – Nov. 2006	0.22* (0.03, 0.42)	0.02	Nov. 2006 – Dec. 2018	-0.30* (-0.36, -0.23)	<0.001

Note. AAPC, average annual percent change; APC, average percent change; 95% confidence interval; n/a, not applicable.
*$p < 0.05$.
[a]2011-2030 European standard population age-standardized mortality rate per 100,000 population.

Table 2
Final sex-specific hemorrhagic stroke GAMM model regression coefficients (95% CI) and p-value (α = 0.05)

	Policy 1 (Jan. 1, 2008)		Policy 2 (Mar. 1, 2017)		Policy 3 (Jan. 1, 2018)	
	Estimate (95% CI)	*p*	Estimate (95% CI)	*p*	Estimate (95% CI)	*p*
Men						
Adjusted R^2	,110		0.098		0.102	
Intercept	4,035 (3,072, 4,998)	<0.001*	3.652 (3.178, 4.125)	<0.001*	3.638 (3.179, 4.096)	<0.001*
Months	0,001 (-0,011, 0,014)	0.852	-0.003 (-0.008, 0.001)	0.165	-0.004 (-0.008, 0.001)	0.093
Policy effect	0,918 (-0,012, 1,848)	0.054	2.358 (-14.327, 19.043)	0.782	-0.278 (-0.896, 0.340)	0.379
CPI	-0,001 (-0,027, 0,026)	0.967	0.002 (-0.029, 0.034)	0.886	0.0003 (-0.025, 0.026)	0.983
Unemployment rate	-0,023 (-0,066, 0,020)	0.303	-0.006 (-0.026, 0.014)	0.551	-0.006 (-0.025, 0.014)	0.579
GDP	-0,0002 (-0,0005, 0,0001)	0.253	0.00003 (-0.0002, 0.0003)	0.809	0.00005 (-0.0002, 0.0003)	0.709
Interaction term[a]	-0,006 (-0,015, 0,003)	0.214	-0.012 (-0.0921, 0.068)	0.763	n/a	n/a
Women						
Adjusted R^2	0.434		0.415		0.412	
Intercept	3.819 (3.094, 4.544)	<0.001*	2.971 (2.626, 3.316)	<0.001*	2.918 (2.579, 3.257)	<0.001*
Months	-0.016 (-0.024, -0.008)	<0.001*	-0.004 (-0.007, -0.001)	<0.004*	-0.005 (-0.008, -0.003)	<0.001*
Policy effect	0.099 (-0.400, 0.598)	0.697	-6.513 (-16.446, 3.420)	0.200	0.017 (-0.351, 0.385)	0.928
CPI	-0.015 (-0.033, 0.003)	0.106	0.008 (-0.011, 0.027)	0.423	-0.0003 (-0.016, 0.016)	0.975
Unemployment rate	-0.052 (-0.094, -0.010)	0.017*	-0.001 (-0.021, 0.019)	0.911	0.0003 (-0.020, 0.020)	0.980
GDP	0.00004 (-0.0002, 0.0002)	0.723	-0.00005 (-0.0002, 0.0001)	0.566	0.000003 (-0.0001, 0.0002)	0.966
Interaction term[a]	0.007 (0.001, 0.013)	0.020*	0.031 (-0.017, 0.078)	0.208	n/a	n/a

Note. GAMM, generalized additive mixed model; CPI, consumer price index; GDP, gross domestic product per capita; 95% confidence interval; n/a, interaction term not included in final model.
*$p < 0.05$.
[a]Between months and policy effect (dummy variable).

indicating that ischemic mortality rates among women declined at a monthly rate of -0.033 deaths per 100,000 population from 2001 to 2018, with a significant negative level change of -1.431 deaths per 100,000 population once Policy 3 reached its full effect.

Discussion

In the current study, we found that the age-standardized stroke subtype-specific mortality rates per 100,000 population significantly declined in Lithuania between 2001 and 2018. Larger annual rates of decline were observed among women than men, with overlapping confidence intervals for ischemic stroke but not for hemorrhagic stroke. The trends identified in the current study provide more recent sex- and stroke subtype-specific mortality rate trends, which largely contradict the trends described by Shah and colleagues (Shah et al., 2019), whom conducted joinpoint regression analyses to estimate the AAPC for sex- and stroke subtype-specific age-standardized mortality rates in Lithuania using WHO global mortality data from 1993 to 2016. While all sex- and stroke subtype-specific mortality rate trends declined between 1993 and 2016, the decline in hemorrhagic stroke mortality rates among women was the only trend found to be significant. Specifically, while no significant joinpoints were identified for hemorrhagic stroke mortality rates among women, the AAPC was equal to -2.5% ($p < 0.05$) for the time period of 1993 to 2016 (Shah et al., 2019). The divergent findings are likely due to the different observation time periods, data sources and populations standards used. Additional explanation is also provided by the significant changes that took place in the risk profile of circulatory diseases among the Lithuanian population between 2001 and 2018. In 2006, the National Program for the Prevention of Circulatory System Diseases in High-Risk Individuals was launched in Lithuania, and the prevalence of the certain risk factors for cardiovascular diseases (e.g., arterial hypertension, dyslipidemia, metabolic syndrome, and smoking (Kutkiene et al., 2018; Laucevičius et al., 2020; Rinkūnienė et al., 2019)) has since decreased.

Results from our time-series analyses support the hypothesis that the 2008, 2017 and 2018 alcohol control policies may have had a relatively greater impact on reducing sex- and stroke subtype-specific mortality rates that demonstrate a J-shaped relative risk dose-response relationship to increasing alcohol consumption levels, compared to those with a linear dose-response relationship. Hemorrhagic stroke mortality among men was the only sex- and stroke subtype-specific category with a linear dose-response relationship (Patra et al., 2010) and our analyses revealed it to be the only category that did not have a significant declining trend in mortality rates that coincided with a policy implementation.

The 2008 alcohol control policy (Policy 1), which involved a 20% excise tax increase for ethyl alcohol, wine, and intermediate products, and a 10% increase for beer, had a significant effect on all sex- and stroke subtype-specific mortality rates with a J-shaped dose-response relationship. However, it is important to acknowledge that the effect of Policy 1 (2008) on sex- and stroke subtype-mortality may have likely been augmented by the 2008 global economic crisis, in comparison to Policy 2 (2017) and Policy 3 (2018) which were implemented during a calm period of stable economic growth. In an interrupted time-series analysis study by Mackenbach et al. (2018), the authors combined census data from Western and Eastern European countries, from 1990 to 2015, to describe sex-specific trends in all-cause and cause-specific mortality rates, and to describe health inequalities in mortality trends. The authors found that among both men and women in Eastern European countries, including Lithuania, alcohol-related mortality rates increased until 2008 and decreased afterwards; albeit not significantly.

Ischemic stroke mortality rates among women were the only category to have declining mortality rates that coincided with all three policy implementation dates. This finding is in contrast to that presented by Štelemėkas et al. (2021) on the effect of Lithuania's alcohol control policies on adult all-cause mortality. The authors investigated the impact of the same three policy enactments investigated in the current study and found that while the alcohol control policies had no significant effects on all-cause mortality among women, Policy 1 and Policy 2 significantly reduced all-cause mortality among men. The results from these two studies suggests that while the investigated alcohol control policies may reduce mortality rates among men to a greater extent than women for most causes of mortality, mortality rates among women are reduced to a greater extent compared to men for stroke subtype-specific mortality. Sex differences in binge-drinking behaviour may provide some explanation as to why alcohol control policies impact stroke subtype-specific mortality rates among women more than men. In a cluster analysis study of Wave 1 and Wave 2 data from the National Epidemiologic Survey on Alcohol and Related Conditions, male drinkers reported a higher amount of average daily alcohol consumption compared to female drinkers (Jiang, Lange, Tran, Imtiaz & Rehm, 2021). It may be possible that alcohol control policies do not have an effect on reducing binge-drinking behaviour and therefore have a greater effect of reducing stroke subtype-specific mortality among women than men.

There are some limitations of the current study that should be acknowledged. First and foremost, the lag structure of alcohol consumption on stroke subtype-specific mortality is not yet established in the literature and as such, the lag structure included in our analysis was informed by a limited number of studies that incorporated

or tested various lag-times for alcohol consumption and stroke (Holmes et al., 2012; Lee et al., 2019; Pun et al., 2013; Razvodovsky, 2014; Zatoński et al., 2010). Therefore, there is a need for formal testing of various lag-times of alcohol consumption on the specific stroke subtypes to improve future time-series analyses. Second, the low to moderate adjusted R^2 values suggest the presence of one or more unknown factors driving the decreasing stroke subtype-specific mortality rates and as such, we encourage researchers to explore other potential explanations, such as binge-drinking behaviour and non-alcohol policy changes related to cardiovascular health, in the future. Third, our models would have benefited from the inclusion of important covariates, such as age to reveal in which age groups the reduction in mortality was most significant, and comorbidity which is an established risk factor for stroke mortality. Finally, the limited number of time points following the 2018 policy enactment could account for the finding that there was no relationship between the reduction in alcohol availability and stroke mortality due to limited power, especially given the suspected lag time for this chronic disease. The significant changes have been observed in a period of 2016 to 2018 during a stable period of economic growth while the alcohol consumption was declining at the same period. This suggests that the future analysis should concentrate on assessing the impact of alcohol control policies on stroke when more data points are available.

Our findings suggest that the effectiveness of alcohol control policies, particularly those targeting price, may differ by sex- and stroke subtype categories. Additionally, such policies may be more effective in reducing sex- and stroke subtype-specific mortality rates if applied in tandem with national health promotion programs aimed to improve cardiovascular health risk profiles but may be less effective in the presence of binge-drinking behaviour, as observed in men. This has implications for policy makers and other relevant stakeholders who are interested in reducing alcohol-related stroke mortality in a developed, high-income country.

Acknowledgements

This work was supported by the National Institute on Alcohol Abuse and Alcoholism of the National Institutes of Health (NIAAA) under grant R01 AA028224, and was conducted as part of the project "Evaluation of the impact of alcohol control policies on morbidity and mortality in Lithuania and other Baltic states".

Conflict of interests

The authors declare no conflicts of interests.

References

Beard, E., Marsden, J., Brown, J., Tombor, I., Stapleton, J., Michie, S. & West, R. (2019). Understanding and using time series analyses in addiction research. *Addiction*, *114*, 1866–1884. doi:10.1111/add.14643.

Chisholm, D., Moro, D., Bertram, M., Pretorius, C., Gmel, G., Shield, K. & Rehm, J. (2018). Are the "best buys" for alcohol control still valid? An update on the comparative cost-effectiveness of alcohol control strategies at the global level. *Journal of Studies on Alcohol and Drugs*, *79*, 514–522. doi:10.15288/JSAD.2018.79.514.

Devroye, L. (1986). General principles in random variate generation. In *Non-Uniform Random Variate Generation* (p. 87). New York: Springer-Verlag New York Inc.

Eurostat. (2013). *2013 edition Revision of the European standard population report of Eurostat's task force*. doi:10.2785/11470.

GBD 2019 Stroke Collaborators. (2021). Global, regional, and national burden of stroke and its risk factors, 1990–2019: A systematic analysis for the Global Burden of Disease Study 2019. *The Lancet Neurology*, *20*, 1–26. doi:10.1016/S1474-4422(21)00252-0.

Holmes, J., Meier, P. S., Booth, A., Guo, Y. & Brennan, A. (2012). The temporal relationship between per capita alcohol consumption and harm: A systematic review of time lag specifications in aggregate time series analyses. *Drug and Alcohol Dependence*, *123*, 7–14. doi:10.1016/j.drugalcdep.2011.12.005.

IHME. (2020). Global Burden of Disease Study 2019 (GBD 2019) Cause List Mapped to ICD Codes | GHDx. http://ghdx.healthdata.org/record/ihme-data/gbd-2019-cause-icd-code-mappings.

Jiang, H., Lange, S., Tran, A., Imtiaz, S. & Rehm, J. (2021). Determining the sex-specific distributions of average daily alcohol consumption using cluster analysis: Is there a separate distribution for people with alcohol dependence? *Population Health Metrics*, *19*, 1–11. doi:10.1186/s12963-021-00261-4.

Kim, H. J., Fay, M. P., Feuer, E. J. & Midthune, D. N. (2000). Permutation tests for joinpoint regression with applications to cancer rates. *Statistics in Medicine*, *19*, 335–351. doi:10.1002/(SICI)1097-0258(20000215)19:3<335::AID-SIM336>3.0.CO;2-Z.

Kutkiene, S., Petrulioniene, Z., Laucevicius, A., Cerkauskiene, R., Staigyte, J., Saulyte, A.,… Rinkuniene, E. (2018). Lipid profile evaluation and severe hypercholesterolaemia screening in the middle-aged population according to nationwide primary prevention programme in Lithuania. *Atherosclerosis*, *277*, 267–272. doi:10.1016/j.atherosclerosis.2018.06.008.

Laucevičius, A., Rinkūnienė, E., Petrulionienė, Ž., Ryliškytė, L., Jucevičienė, A., Puronaitė, R.,… Kasiulevičius, V. (2020). Trends in cardiovascular risk factor prevalence among Lithuanian middle-aged adults between 2009

and 2018. *Atherosclerosis*, *299*, 9–14. doi:10.1016/j.atherosclerosis.2020.02.025.

Lee, C. B., Liao, C. M., Peng, L. H. & Lin, C. M. (2019). Economic fluctuations and cardiovascular diseases: A multiple-input time series analysis. *PLoS ONE*, *14*. doi:10.1371/journal.pone.0219358.

Lhachimi, S. K., Cole, K. J., Nusselder, W. J., Smit, H. A., Baili, P., Bennett, K.,… Boshuizen, H. (2012). Health impacts of increasing alcohol prices in the European Union: A dynamic projection. *Preventive Medicine*, *55*, 237–243. doi:10.1016/j.ypmed.2012.06.006.

Lithuanian Department of Statistics. (n.d.). Main Lithuanian indicators. https://osp.stat.gov.lt/en/pagrindiniai-salies-rodikliai.

Lithuanian Department of Statistics. (2020a). GDP per capita, at current prices. https://osp.stat.gov.lt/statistiniu-rodikliu-analize#/.

Lithuanian Department of Statistics. (2020b). Unemployment rate in Lithuania. https://osp.stat.gov.lt/statistiniu-rodikliu-analize#/.

Lithuanian Department of Statistics. (2021). Consumer price indices (2015 − 100).

Mackenbach, J. P., Valverde, J. R., Artnik, B., Bopp, M., Brønnum-Hansen, H., Deboosere, P.,… Nusselder, W. J. (2018). Trends in health inequalities in 27 European countries. *Proceedings of the National Academy of Sciences of the United States of America*, *115*, 6440–6445. doi:10.1073/pnas.1800028115.

Miščikienė, L., Midttun, N. G., Galkus, L., Belian, G., Petkevičienė, J., Vaitkevičiūtė, J. & Štelemėkas, M. (2020). Review of the lithuanian alcohol control legislation in 1990–2020. *International Journal of Environmental Research and Public Health*, *17*. doi:10.3390/ijerph17103454.

O'Donnell, M. J., Chin, S. L., Rangarajan, S., Xavier, D., Liu, L., Zhang, H.,… Yusuf, S. (2016). Global and regional effects of potentially modifiable risk factors associated with acute stroke in 32 countries (INTERSTROKE): A case-control study. *The Lancet*, *388*, 761–775. doi:10.1016/S0140-6736(16)30506-2.

Patra, J., Taylor, B., Irving, H., Roerecke, M., Baliunas, D., Mohapatra, S. & Rehm, J. (2010). Alcohol consumption and the risk of morbidity and mortality for different stroke types - a systematic review and meta-analysis. *BMC Public Health*, *10*, 258. doi:10.1186/1471-2458-10-258.

Pun, V. C., Lin, H., Kim, J. H., Yip, B. H. K., Chung, V. C. H., Wong, M. C. S.,… Tian, L. (2013). Impacts of alcohol duty reductions on cardiovascular mortality among elderly Chinese: A 10-year time series analysis. *Journal of Epidemiology and Community Health*, *67*, 514–518. doi:10.1136/jech-2012-201859.

Razvodovsky, Y. E. (2014). Fraction of stroke mortality attributable to alcohol consumption in Russia. *Adicciones*, *26*, 126–133. doi:10.20882/ADICCIONES.14.

Rehm, J., Gmel, G. E., Gmel, G., Hasan, O. S. M., Imtiaz, S., Popova, S.,… Shuper, P. A. (2017). The relationship between different dimensions of alcohol use and the burden of disease—an update. *Addiction*, *112*, 968–1001. doi:10.1111/add.13757.

Rehm, J., Štelemėkas, M., Ferreira-Borges, C., Jiang, H., Lange, S., Neufeld, M.,… Manthey, J. (2021). Classifying alcohol control policies with respect to expected changes in consumption and alcohol-attributable harm: The example of Lithuania, 2000–2019. *International Journal of Environmental Research and Public Health*, *18*, 1–13. doi:10.3390/ijerph18052419.

Rinkūnienė, E., Petrulionienė, Ž., Dženkevičiūtė, V., Gimžauskaitė, S., Mainelis, A., Puronaitė, R.,… Laucevičius, A. (2019). Trends in cigarette smoking among middle-aged lithuanian subjects participating in the primary prevention program between 2009 and 2016. *Medicina (Lithuania)*, *55*, 130. doi:10.3390/medicina55050130.

RStudio Team. (2020). *RStudio: Integrated Development Environment for R*. Boston, MA: RStudio, PBC.

Schmidt, L. A., Mäkelä, P., Rehm, J. & Room, R. (2010). Alcohol: Equity and social determinants. In E. Blas & A. S. Kurup (Eds.), *Equity, social determinants and public health programmes* (pp. 11–29). Geneva: World Health Organization.

Shah, R., Wilkins, E., Nichols, M., Kelly, P., El-Sadi, F., Lucy Wright, F. & Townsend, N. (2019). Epidemiology report: Trends in sex-specific cerebrovascular disease mortality in Europe based on WHO mortality data. *European Heart Journal*, *40*, 755–764. doi:10.1093/eurheartj/ehy378.

Shapiro, S. S. & Wilk, M. B. (1965). An analysis of variance test for normality (complete samples). *Biometrika*, *52*, 591–611. doi:10.1093/biomet/52.3-4.591.

Shield, K., Manthey, J., Rylett, M., Probst, C., Wettlaufer, A., Parry, C. D. H. & Rehm, J. (2020). National, regional, and global burdens of disease from 2000 to 2016 attributable to alcohol use: A comparative risk assessment study. *The Lancet Public Health*, *5*, 51–61. doi:10.1016/S2468-2667(19)30231-2.

Statistical Methodology and Applications Branch, Surveillance Research Program, N. C. I. (2020). *Joinpoint Regression Program*.

Štelemėkas, M., Manthey, J., Badaras, R., Casswell, S., Ferreira-Borges, C., Kalėdienė, R.,… Rehm, J. (2021). Alcohol control policy measures and all-cause mortality in Lithuania: An interrupted time–series analysis. *Addiction*, *116*, 2673–2684. doi:10.1111/add.15470.

Stuckler, D., Meissner, C. M. & King, L. P. (2008). Can a bank crisis break your heart? *Globalization and Health*, *4*, 1–4. doi:10.1186/1744-8603-4-1.

World Health Organization. (2017). *'Best Buys' and Other Recommended Interventions for the Prevention and Control of Noncommunicable Diseases*. Geneva, Switzerland.

World Health Organization. (2018). Global status report on alcohol and health 2018. https://apps.who.int/iris/handle/10665/274603.

Zatoński, W. A., Sulkowska, U., Mańczuk, M., Rehm, J., Boffetta, P., Lowenfels, A. B. & La Vecchia, C. (2010). Liver cirrhosis mortality in Europe, with special attention to Central and Eastern Europe. *European Addiction Research*, *16*, 193–201. doi:10.1159/000317248.

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

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. In this regard *Adicciones* follows the recommendations of the ISAJE (*International Society of Addiction Journals Editors*). 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.

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.

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.

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.

Brief Reports

This section refers to research work which due to its special characteristics (small numbers of observations, clinical cases, research with highly specific aims and results, descriptive epidemiological studies, first results of a wide-ranging study, etc.) can be published in brief form. Where possible, these articles will have the same types of sections as full articles; they should be a maximum of 12 pages (double-spaced) in length.

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. 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 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.

4. MANUSCRIPT REVIEW PROCESS

Articles are submitted to the journal via www.adicciones.es. 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 Editor, normally in consultation with the Associate Editors, 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 or Associate Editors 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 or from the Associate Editor in charge of the review process, will be taken by the Editor of the journal, who may also consult the Associate Editors. 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. The authors will receive a version with possible format and style corrections, to which they must respond within a maximum of 10 days.
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. Once payment has been received, the article will be translated into English or Spanish, depending on the original language of the article.
4. A final document or galley proof will be generated, which the authors must also review.
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.

Authors are fully responsible for the final published version. 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.

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.

The authors agree to include in the manuscript all necessary permissions to reproduce previously published material, such as text, tables or figures.

2024 ■ VOL. 36 ■ N. 2
ADICCIONES

EDITORIAL

ORIGINALS / ORIGINALES

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

FINANCIADO POR:
MINISTERIO DE SANIDAD
SECRETARÍA DE ESTADO DE SANIDAD
DELEGACIÓN DEL GOBIERNO PARA EL PLAN NACIONAL SOBRE DROGAS