An evaluation of a psychoeducational harm-reduction focused intervention targeting music festival attendees/at risk of negative outcomes surrounding recreational substance use

C.L. Rayner ⬤, C. Bradshaw and J. Davies

Abstract
This pilot study assessed a video-based psychoeducational intervention designed to reduce substance-related harm among music festival attendees. Participants (N = 273) completed pre-intervention surveys, with 144 engaging in the intervention. Post-intervention, 80% of participants correctly recalled key information from the video. Analysis showed a significant reduction in self-reported substance-related harm post-intervention, suggesting potential efficacy in reducing harm. One-third of participants anticipated positive changes in behavior, and half reported a direct impact on their substance use practices. Additionally, many expressed improved perceptions of onsite services and an increased intention to adopt harm reduction strategies post-intervention. Evaluative participant feedback emphasized the need for modifications to improve engagement, such as incorporating real actors, shortening the video, and distribution methods like email and large screens at festival entrances. These suggestions highlight areas for refinement to enhance the intervention's reach and impact. The findings demonstrate the potential of online psychoeducational interventions as cost-effective tools for harm reduction in festival settings. However, large-scale trials are necessary to validate these results and address challenges related to participant retention and data reliability. Future research should focus on improving the intervention's design to strengthen its efficacy and sustainability in real-world settings.

Keywords
music festivals, drug use, harm reduction, intervention, psychoeducation

Introduction

Recreational substance use is prevalent among young festival attendees (Bijlsma et al., 2020; Gjerde et al., 2019; Hughes et al., 2019), often resulting in adverse outcomes, ranging from mild physical or psychological effects to severe incidents, including mental health crises, physical injury, sexual assault, and violence (Black et al., 2020; Measham & Turnbull, 2021; Palamar & Sönmez, 2022). However, engaging in safer behaviors and harm reduction strategies significantly reduces these risks (Grigg, Barratt & Lenton, 2018; Kranz, 2020), improving both individual and public health outcomes (Giulini et al., 2023; Munn et al., 2016). Previous research has identified a number of predictors of harm at music festivals, including engaging in risky behaviors (e.g. poly-substance use) alongside specific psychological and demographic traits (Rayner et al., 2025). Addressing these factors could help to mitigate

harm, thereby reducing the need for on-site assistance, improving attendee experience, and alleviating pressure on medical and community services.

Psychoeducational interventions and harm reduction

Psychoeducation began as a behavioral approach to teach patients and their families about conditions, communication, and problem-solving strategies (Anderson et al., 1980) and has evolved into interventions that inform individuals about health behaviors via support and self-management skills

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(Huttunen-Lenz, Song & Poland, 2010; Lopes et al., 2021). It is now broadly defined as systematically informing patients and their relatives about their illness to enhance understanding and management (Ferrin et al., 2014). Its scope has expanded from illness management to address health-risk behaviors and improve decision-making (Brooks et al., 2021), as evidenced in public health promotion (Dugdale et al., 2019; Marín-Navarrete et al., 2018; Sarkhel, Singh & Arora, 2020). At festivals, psychoeducation can promote safer choices by increasing awareness and encouraging protective behaviors regarding substance use (Kargin & Hicdurmaz, 2020; Srivastava & Panday, 2016).

Substance-using festival attendees who do not seek help can be hard to reach (Measham, 2019; Palamar, Acosta & Cleland, 2019), with engagement challenges reported by frontline workers (Hughes et al., 2019; Rayner, 2024). Online delivery of psychoeducation before festivals may overcome these barriers by offering broader access, cost efficiency, and convenience (Schuster et al., 2020). In substance use, harm reduction-based psychoeducation supports safer behaviors to reduce risks despite conflicts with drug policy and misconceptions that it promotes substance use (Earnshaw, 2020; Scott & Scott, 2020). Stigma further limits help-seeking for illicit drug use (Appleseth, Zwick & Arndt, 2020; Wogen & Restrepo, 2020), whereas alcohol, a significant harm predictor at festivals (Rayner et al., In Submission), lacks similar stigma, possibly leading to underestimated risks (Grace, Moore & Northcote, 2009).

This study provides non-judgmental, accurate harm reduction information on the risks of substance use at festivals (especially alcohol, MDMA, and ketamine) and targets high-risk, hard-to-reach attendees through online psychoeducation (Hughes et al., 2019; Measham, 2019; Page et al., 2022).

Study aims

The present study pilots a novel, online, brief psychoeducational harm reduction intervention for music festival attendees. Through the use of a longitudinal design, the acceptability, feasibility, and potential impact of the intervention will be assessed, and evaluative data will be collected to enable further development and testing of the intervention. The study assesses recall of harm reduction messaging and changes to safety behaviors and help-seeking while at festivals over a single festival season.

Method

Intervention design and delivery

Harm reduction interventions for substance use often target a broad audience, which can dilute their effectiveness by providing irrelevant information, potentially leading to disengagement (Van Den Berg et al., 2017). This psychoeducational intervention specifically targeted individuals attending music festivals, who are at increased risk of substance-related harm due to escalated use patterns and impulsivity, as identified in previous research (Rayner, 2024). The intervention aimed to educate festival attendees on harm reduction strategies before attending the event, addressing a gap in existing resources like those provided by Festival Safe, which require proactive engagement that may be lacking among at-risk individuals (Page et al., 2022).

The online intervention video, designed to be brief and engaging, focused on educating participants about factors that increase the risk of harm (risk amplifiers), such as specific psychological traits and behaviors, as well as providing practical harm reduction strategies. Content was informed by findings from previous research (Rayner et al., In Submission) and included prompts for self-reflection to enhance relevance and impact. Practical advice on safer substance use was included and information on accessing onsite support services, including medical teams and law enforcement, was provided. This included encouraging attendees to seek out the location and availability of onsite services upon arrival at festivals. Together the package was designed to reduce stigma and encourage timely help-seeking. The intervention video could be accessed on mobile devices and was distributed through social media platforms frequented by this demographic, ensuring wide reach and engagement.

Procedure

Participants were primarily recruited via targeted social media advertisements aimed at young people, as they are at higher risk for negative outcomes. However, the study remained open to all ages to allow for comparison. Inclusion criteria required participants to be over 18 and planning to attend at least one UK music festival in summer 2022 and have attended at least one UK music festival in the previous year. Previous research has highlighted differences between online and offline sampling methods in studies of drug use and nightlife behavior, demonstrating that online surveys can effectively reach specific populations while acknowledging potential limitations in representativeness (Waldron et al., 2020).

A total of 57 social media ads were placed on platforms such as Facebook, Reddit, Twitter, and Instagram, targeting festival-related groups and threads. Participants accessed study information via a link on the advertisement, which detailed study aims, ethical considerations, and data processing procedures. Informed consent was obtained, confirming participants met the inclusion criteria.

The study itself consisted of three linked surveys and an embedded video-based psychoeducational intervention. The first survey collected data on sociodemographic variables, historical, and intended substance use at music

festivals pre-intervention. This was followed by the intervention video, which could not be fast-forwarded or skipped. Next participants completed the second survey which collected immediate evaluative feedback and perceived impact, including potential behavioral changes at upcoming festivals. Participants were also asked to provide details of the festival(s) they would attend and to create a unique reproducible identifier for longitudinal tracking. The third survey, administered 3–6 months post-intervention, assessed actual substance use at the festival attended and questions designed to examine the long-term impact of the intervention. Participation was voluntary, with exit points at the end of each survey. Debrief documents were provided after all exit points, containing educational information and support resources. Data from participants who disengaged were analyzed to identify factors associated with dropout.

Ethical considerations

Ethical approval was granted by the Swansea University Ethics Committee (Ref: 5458). As part of the approval, participants were informed that abstinence was the safest option, and the intervention encouraged early help-seeking behavior. Participants were required to be at least 18 years old, and data on intended substance use were collected prior to the intervention and anonymously.

Data analysis

The study employed a mixed-methods approach, collecting and triangulating both quantitative and qualitative data. Non-parametric tests were used due to the lack of normal distribution in quantitative data. Qualitative open-text responses were analyzed using content analysis, with data coded inductively to identify common themes; given the brevity of responses, this approach was considered appropriate and proportionate.

A unique participant identifier was used to link data between the initial and follow-up surveys. This method of data linkage proved to be challenging as some participants did not remember or provide this unique identifier during data collection at the second time point. Some participants completed the follow-up survey after attending multiple festivals; only data from the first post-intervention festival were included in the analysis.

Participants

The study recruited 468 participants, with 273 completing at least 50% of the initial survey. Of these, 144 engaged with the intervention and provided immediate feedback, and 68 completed a follow-up survey after attending a festival though it was only possible to link 31 cases due to inconsistencies in the ways participants provided linking information. The sample was right skewed by age, with more young participants (Mean = 30.87, SD = 9.98). Gender distribution was slightly skewed towards males (63.6%, N = 177, with 31.0% (N = 85) identifying as female and 4.4% (N = 12) as non-binary or similar. Most participants were white (N = 226, 83.1%), employed full-time (N = 179, 67.3%). 41.7% had an undergraduate education (N = 113) which was the most commonly reported level of education. Relationship status was evenly split between single (N = 109; 40.1%) and partnered individuals (N = 163, 59.9%).

Results

Behavioral history and pre-intervention intentions

Most participants reported an intention to use at least one substance recreationally at a future music festival (mean number of substances = 3.87; SD = 2.193) with only six intending to abstain, and one not disclosing their intentions. The most common substances intended to be used were alcohol (N = 239, 88.2%), MDMA (N = 171, 63.1%), cannabis (N = 153, 56.5%), psychedelics (N = 119, 43.9%), and cocaine (N = 114, 42.1%). Over half of the participants reported some history of experiencing previous harm through substance use (N = 163, 59.4%), with the most common being unwanted side effects (N = 109, 40.2%) and getting lost (N = 66, 24.4%). Over half of the participants reported previous use of harm reduction strategies (N = 146, 53.9%), and most indicated that they would feel safe seeking help from medical (N = 225, 83.0%), or welfare services (N = 182, 67.2%) at festivals.

Factors associated with intervention engagement

Of the 144 participants who began the intervention 81.9% correctly responded to a multiple-choice question relating to the first half of the video. An optional information sheet containing details of the relationship between harm and psychological factors such as locus of control, agreeableness, and achievement values was accessed by 23.6% of participants.

There were no significant differences found between participants who engaged with the intervention (N = 144) and those who disengaged at the intervention stage (N = 127) in relation to age, gender, education, employment, relationship status nor in the types of substances intended for use at a future festival. A significant difference between engagement groups in total substance types endorsed was found (more substance types endorsed among those who did engage; U = 7737.50, p = 0.027), though the effect size was small.

New learning and perceived impact

After watching the psychoeducational harm reduction video, participants provided immediate feedback on their

Table 1. Differences in reported receptivity to help-seeking pre and post-intervention per service provision type.

Receptive to seeking help from onsite service	Pre-intervention (N = 144)		Post-intervention (N = 144)	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Police	6	4.2	20	13.9
Medical	121	84.0	127	88.2
Welfare	105	72.9	121	84.0
Stewards	42	29.2	64	44.4
Security	13	9.0	26	18.1
None	5	3.5	7	4.9

experience and perceived likelihood of behavioral changes. Just over half found the video engaging (N = 78, 56.5%), with 36 participants (26.1%) learning new information and an additional 21 (15.2%) stating they may have learned something new. Review of open-text responses showed that the new learning concerned a) the nature and availability of onsite support services (including the police as a support resource); b) impact of risk amplifiers upon the likelihood of experiencing associated harms following substance use at music festivals; and c) information about the frequency and prevalence of substance use at music festivals. Onsite services where participants reported the lowest rates of receptivity to help-seeking pre-intervention showed the greatest positive change in perception post-intervention, with statistically significant increases to seeking help towards the police, welfare, stewarding, and security services (Table 1). Despite this, most participants stated they did not plan to change their behavior due to the video (yes: N = 13, 9.4%; maybe: N = 39, 28.1%; no: N = 87, 62.6%).

Content feedback

Overall, participants provided positive feedback surrounding the educational content of the video: *"good video really knowledgeable and informative"*; the wider ambition of reducing harms: *"good idea and I hope you continue to spread awareness"*; and the non-judgmental and empathetic presentational tone: *"I liked that the video was accepting of the fact that people use illegal substances, it didn't come across as "preachy"*; *"It was nicely written and non-condescending."*

Open ended text feedback on the video material confirmed that for most participants they were already familiar with the content provided: *"A lot of it consists of things I already know and what to look out for."* However, participant feedback also highlighted three topics within the video content which were new to them, or which could readily apply to their own situation or possible future behavior at festivals:

1. Risk amplifiers (e.g. "I might be more at risk as I am younger and mix alcohol").
2. Identifying the presence of, location of, and access to available onsite services (e.g. "Reducing risks

by knowing what I'm taking, figure out where I can potentially get help ahead of time").
3. Harm reduction strategies (e.g. "make sure you are well hydrated, rested etc…"; "Eat, drink and sleep").

Improving content memorability. Participants offered several suggestions for improving the video style, presentation, and length. Software and resource limitations resulted in the use of an animated style video and voiceover program where the images were cartoon-like, and the accents were computerized, American and cooperate in style. Perhaps unsurprisingly, participants suggested having *"a more engaging narrator"* and *"using a real person's voice"* as well as using *real people and not animation."* Participants also suggested that it would be *"more engaging listening to real life experience and case studies"* using *"Famous DJ's, artists speaking about harm reduction and risk amplifiers in the videos."*

Some participants suggested that the video should be *"shorter if possible"* with suggestions of edits that could be made to the content and changes to the presentation such as *"increase text to speech speed by 25%."* Conversely, some participants provided suggestions for additional content within the video such as *"a section on testing substances,"* images of different support services and specific advice or links to drug specific information including harm reduction for specific substances and dosing advice. Finally, participants suggested the use of interactive elements either by *"showing the video in increments and then having viewers answer questions"* or by *"provide[ing] an alternative interactive version for more intimate environments."*

Delivery method evaluation. Participants considered that the most effective methods of distributing the video would be *in an email with festival tickets* (N = 33, 24.3%); *in an email a few days before the festival starts* (N = 34, 25.0%); and *on screens at the festival gates* (N = 45, 33.1%). Although listed as an option within the multiple-choice question several participants suggested delivering the intervention video to attendees while queuing to enter the event within their text responses: *"Waiting in line can take HOURS! Play in the queue at the gates."*

Intervention video impact on festival actions and experiences

In the follow-up survey, participants reported that their substance use at the post-intervention festival was similar to pre-intervention levels (N = 27, 52.9%), though a notable proportion indicated a decrease (N = 15, 29.4%). A small proportion did report increased substance use post-intervention (N = 9; 17.7%).

In the follow-up survey, most participants (N = 50) reported no use of onsite support services with two having used welfare services, and one having used medical services. Where data timepoints could be matched and participants provided data on intended (pre-intervention) and actual substance use (post-intervention) (N = 31); no significant differences were found between reported usage rates for any substance type. Similarly, there were no significant differences in the prevalence of high-risk behaviors reported (e.g. using high doses, buying from untrusted sources) or in the rate of harm reduction strategy use. However, the reported total number of harms (e.g. medical or mental health issues, assault, altercations, bad trips, and unwanted effects) experienced at festivals post-intervention (M = 0.35, SD = 0.61) significantly decreased (Z = 26.00, p = 0.013) from the rate reported pre-intervention (M = 0.87, SD = 0.99).

Just under half of the participants (N = 21, 42.9%) reported having "used" information from the intervention video at the music festival they had attended post-intervention. Review of text responses showed this reflected an increased awareness of onsite services which could be accessed for support in the event of substance use related harm: "*I was aware of who I could ask if I needed help*"; "*I knew where help was*"; and the application of harm reduction strategies: "*I did keep in mind safe practices, especially when it came to not mixing substances*"; "*I made sure I had eaten well and was well hydrated*"; "*more self-aware of the things I was taking and actually waiting to feel the effects before double dosing etc.*" Given that some participants attended the music festival up to 6 months following the delivery of intervention, this suggests the possibility of some significant longitudinal recall of the content. For those who hadn't used the video information reasons included not needing the advice in the video: "*I already am quite careful*"; "*There was no new information in the video that I don't already use*"; or forgetting the intervention video either prior to or during the music festival that they had attended: "*I don't even really remember the video*"; "*Forgot it existed.*"

Perceived longitudinal behavioral changes. Almost half of the participants (*yes'*: N = 11, 22.4%; *maybe'*: N = 13, 26.5%) felt that the intervention video had or may have impacted their substance use practices or behaviors at the festival they had attended post-intervention. Review of the text responses suggest that some within the "*maybe*" group are already cautious (e.g. "*I am already more cautious than the average person*"; "*I try to be careful about my drug use - the video helped me with this*"; "*Minimized alcohol consumption since mixing with MDMA but I usually do this anyway*"), while for others, "*I was aware of the advice, but I don't think it stopped me doing what I wanted.*" Within the "yes" group, three clusters of action were noted specifically:

1. An increased awareness of risk and self-identification of vulnerability to harm (e.g. "*I was more thoughtful about the risks; they were more part of my plan than before.*")
2. An understanding of how to access onsite services (e.g. "*It definitely helped me when I was feeling a bit anxious to know there were people who could help*")
3. The use of specific harm reduction strategies and safer substance use practices (e.g. "*I ordered my substances from a trusted source before I used to buy them from untrusted sources in the festival*"

Reducing risks

Post-intervention, participants reported increased awareness of substance use risks at music festivals (yes: N = 66, 45.8%; maybe: N = 33, 22.9%) and a significant shift in intention to use harm reduction strategies pre- to post-intervention (X^2 (4, 139) = 49.17, p < 0.001).

Discussion

The findings from this pilot study are promising and support the potential efficacy of the intervention, suggesting a need for large-scale studies to refine and expand the model. Despite limitations regarding engagement, around 80% of participants who engaged recalled correct information from the video immediately after. This level of engagement, though typical for online psychoeducational interventions (Linardon & Fuller-Tyszkiewicz, 2020; Paiva Azevedo et al., 2019), indicates that those who participated found the content relevant and engaging (Borghouts et al., 2021). Short-term recall further validates adherence beyond self-reports (Flett et al., 2019).

Demographic and behavioral comparisons between those who engaged and those who did not showed similar profiles, except for the number of substances intended for use. Those planning to use more substances were more likely to engage, suggesting self-selection based on relevance (Bertholet et al., 2020; Keiding & Louis, 2018). This self-selection could lead to disengagement by those with fewer substance use intentions (Tuithof et al., 2016). Future models should address engagement from attendees

who do not plan to use substances but may still benefit from harm reduction.

Feedback indicated that one-third of participants anticipated behavior changes due to the intervention, with half believing it influenced their substance use practices. Qualitative data suggests increased self-awareness of risks and harm amplifiers (Ebert et al., 2018; Milne-Ives et al., 2020). The intervention also fostered the adoption of harm reduction strategies and increased receptivity to onsite help services. Notably, one-third reported reduced substance use post-intervention, suggesting a potential impact on substance use behaviors (Black et al., 2020; Nordfjærn et al., 2016).

Participants also demonstrated improved perceptions of onsite services and reported better awareness of substance-related risks. A significant increase in the intention to use harm reduction strategies was observed. The intervention's success in promoting safer behaviors and early help-seeking suggests it could facilitate earlier intervention and reduce service burdens (Black et al., 2020; Hughes et al., 2019; Page et al., 2022).

Feedback on the intervention highlighted areas for improvement, such as using real actors and reducing video length to enhance engagement. Participants with extensive prior experience of substance use and festival attendance often reported that the intervention content felt less relevant to them personally. However, they also recognized that the information could be highly valuable for individuals who were newer to these settings or to drug use, highlighting the potential utility of the intervention for those with less established knowledge of harm reduction strategies. Future adaptations should consider email distribution, website integration, and large-screen displays to maximize reach. Participants valued the non-stigmatized approach, suggesting a need for changes in drug policy to support similar interventions. This stability in drug use suggests the intervention effectively provided harm reduction information without increasing substance use or its normalization.

Limitations

The relatively small sample size limits the statistical power of the study and reduces the reliability and generalisability of the findings. As such, the results should be interpreted with caution. However, the study was designed as an evaluative pilot, with the primary aim of assessing feasibility and gathering preliminary insights. Within this context, the sample size was sufficient to inform future, large-scale investigations. Significant attrition, particularly in the longitudinal follow-up, limits the conclusions. Of the 250 initial participants, only 144 completed the intervention, and 53 returned for follow-up. Data linkage proved challenging as several participants failed to provide their unique identifier during the second timepoint for data collection. Attrition is common in online studies (Bevens et al.,

2022; Maher et al., 2014), and future research should address this with incentives or improved engagement techniques (Cohen & Schleider, 2022). The only notable difference in engagement was a higher substance use intent, suggesting a self-selection bias (Bertholet et al., 2020; Keiding & Louis, 2018). Future studies should explore factors influencing engagement and consider methods to enhance data linkage (Audette, Hammond & Rochester, 2020; Yurek, Vasey & Sullivan Havens, 2008).

Replication and future research

Given the small sample size and potential type II error risk (Akobeng, 2016), future research should include larger samples and potentially split quantitative and qualitative assessments. The format of the intervention allows for easy integration into festival websites and apps in the future, with embedded links for those seeking further information.

Focus groups could provide richer feedback (Brett et al., 2014; Greenhalgh et al., 2019; Hughes & Duffy, 2018), and a randomized controlled trial (RCT) comparing the intervention with a wait-list control would strengthen evidence of efficacy (Singal, Higgins & Waljee, 2014). Larger samples and incentive use may reduce attrition and enhance reliability.

Implications

This pilot study offers insights into the effectiveness of psychoeducational harm reduction interventions for music festival attendees. The model's cost-effectiveness and non-judgmental approach suggest it could significantly reduce harm and improve public health outcomes (Ginter, Duncan & Swayne, 2018). Future research should focus on refining and scaling this approach to maximize its impact.

Conclusions

This study indicates the intervention model's potential efficacy in promoting safer substance use practices and receptivity to help-seeking. However, further adaptation and extensive testing are necessary to confirm its impact on behavioral change. The positive participant feedback and observed changes in behavior suggest a promising model for reducing substance-related harm.

These findings further suggest that participants feel the captive audience within entry queues may allow for better engagement, and therefore behavioral change, if used as a delivery method for the psychoeducational video piloted.

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Ethical considerations

Approval for the present study was obtained from Swansea University (Ref: 2368) with the study design and delivery informed by Ethics Guidelines for Conducting Internet Mediated Research.

Consent to participate

Obtained by participants via a consent form integrated within the online survey.

Authors' contributions

All authors were involved in the development of the design of the study. CR led the study, collected and analyzed the data. JD, and CB, provided overall methodological and content expertise guidance. CR compiled the initial manuscript; all authors contributed edits and have read and approved the final manuscript.

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Data availability

Due to the extensive size of the datasets used and/or analyzed during the current study additional analysis and future publications are intended. As such the dataset is not currently publicly available. However, in order to manage data access requests from other researchers, the dataset may be obtained from the corresponding author upon reasonable request.

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