

20 minutes or less: evidence of the need for a very brief intervention (VBI) for cannabis users

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Introduction

Prevalence of cannabis use

Cannabis is the most widely used illicit drug, with up to 5% of the world's population aged 15 to 64 years reporting use in the past 12 months.¹ Initiation of cannabis use typically occurs during the adolescent years² and in most cases remains experimental and irregular, with the majority of people ceasing use in their mid-to-late twenties.^{3,4} However, a proportion of people who try cannabis will go on to use more regularly and for a longer period of time.

Cannabis dependence

Approximately 10% of those who ever try cannabis will become dependent on the drug.⁵ A younger age of initiation⁶ and higher frequency of use^{7,8} have been shown to increase the risk of developing dependence. Australian research shows that almost one-third (29%) of adolescent weekly users will develop cannabis dependence by age 24.⁹ The risk of dependence increases to one-in-two among daily cannabis users.⁵ Cannabis dependence is characterised by a maladaptive pattern of use causing significant psychological impairment and distress.¹⁰ Those dependent on cannabis report being unable to refrain from using cannabis despite experiencing a range of social, psychological, and physical consequences of their use, including social and family problems, financial difficulties, poor mental and physical health, and cognitive problems.^{6,11,12} Most will also experience a withdrawal syndrome upon cessation.¹³

Other cannabis-related harms

While cannabis dependence is the most obvious harm, there is a growing body of evidence of additional harms of cannabis use; especially among adolescents, those who begin using at a younger age, heavy users, and those with a personal or family history of mental health problems.^{14,15} For instance, regular users of cannabis are more likely than non-users to present to healthcare services with a range of respiratory (cough, wheezing, bronchitis)^{16,17} and cardiovascular complaints.^{6,14,15} One European study found approximately one-in-five cannabis-related hospitalisations involved either a respiratory system disorder or cardiovascular disorder.¹⁸ Similarly, in Australia, cannabis-related presentations to the emergency department (ED) have been reported to commonly involve physical health problems, including cardiovascular, respiratory, gastrointestinal, and neurological problems.¹⁹ There is also a significant association between cannabis use and the risk of injury. A large retrospective study found that cannabis users were 1.5 times more likely to suffer an injury that required hospitalisation relative to non-users, with self-inflicted injuries having the highest risk-ratio (2.13 for women, and 3.43 among men)²⁰.

Studies have also drug tested injured patients and found the presence of cannabis in 4% to 12% of those fatally injured, and 6% to 37% of those with non-fatal injuries.²¹ Further, cannabis is the most common illicit drug detected in drivers who have been injured or killed in motor vehicle accidents^{22, 23}.

Cannabis use is also linked with mental health problems. The risk of developing psychotic symptoms approximately doubles among regular and heavy users¹⁵, and they may be more likely to experience anxiety and depression compared to non-users^{5, 15, 24, 25}. In a study of more than 14,000 adults from the general population, Cheung and colleagues found that compared to abstainers, both infrequent and heavy cannabis users were more likely to have a diagnosed anxiety or mood disorder.²⁶ Similarly, an Australian study exploring the characteristics of cannabis-related ED presentations found one-in-five patients had a mental health issue as their presenting concern; the most common of which was anxiety (35.2%), followed by psychosis (30.3%), and suicide risk (14.8%).²⁷ In the same study, those with a cannabis-related presentation were found to be 7.6 times more likely to have a current mental health diagnosis than non-drug or alcohol-related ED patients.²⁷ In addition, regular cannabis use has been linked with impaired cognitive and psychomotor functioning.²⁸ Cannabis use during adolescence has also been associated with poor educational achievement and psychosocial outcomes.¹⁵

Cannabis use treatment

The high rate of cannabis use among the general public suggests a considerable proportion of users will experience cannabis dependence or misuse, and will require treatment services. Indeed, between 2011 and 2012 in Australia, nearly half (44%) of all presentations to government funded alcohol and drug treatment services included cannabis as a drug of concern; second only to alcohol (62%).²⁹ Cannabis was the principal drug of concern for 22% of these treatment episodes.²⁹ However, despite these apparently high rates of treatment engagement, the majority of cannabis users have been reported to infrequently access services for their cannabis use problems.³⁰ Reports suggest that just 10% to 36% of those with a cannabis use disorder will receive treatment.³¹⁻³³ This is lower than the rate of treatment uptake for other illicit drugs.^{34, 35} Also, the rate of involuntary referrals is very high among cannabis use treatment patients, particularly from the criminal justice system.^{29, 36} In fact, just a minority will acknowledge their need and self-refer for treatment.³⁶ Studies have also shown that cannabis-using individuals are most likely to consult a general practitioner for their cannabis use problems rather than a specialist provider.³⁷

For those who do attend treatment (whether mandated or voluntary), the most commonly accessed forms are outpatient counselling or withdrawal management.²⁹ Common counselling techniques based on cognitive-behavioural and motivational therapies have been adapted from interventions developed to treat alcohol and nicotine dependence. Evaluations of such interventions provide some support for their efficacy in treating cannabis dependence, at least in the short-term.^{38, 39} Unfortunately however, by the time people enter treatment they have typically been using cannabis almost-daily for 10 years or more³⁰, making the experience of cannabis dependence more likely, and treatment more difficult. Current treatment options are also often time and resource intensive and availability is generally limited and only offered to those who meet diagnostic criteria for a cannabis use disorder. Yet, not all cannabis users develop dependence and cannabis use that does not meet criteria for abuse or dependence can also put users at risk of harm⁴⁰. Besides general prevention, there is a lack of initiatives targeting non-dependent users. Interventions targeted at non-treatment seeking at-risk users, informing them of the harms they may be exposing themselves to, may prevent the progression to cannabis misuse and dependence, and minimise the occurrence of cannabis-related harms. Given the rates of cannabis use in the general population, early detection and intervention of unhealthy cannabis use is favorable from a public health perspective.

Brief interventions (BI) have evolved as a public health approach to reduce the burden of injury, disease, and disability associated with a range of health-limiting behaviours, including substance use. This article assesses the current evidence for the utility of the BI model for cannabis users, and outlines the current gaps in knowledge and future research directions. Further, it will consider the role of screening procedures, which could play an important role in the process of change, and which may offer an avenue for the development of very brief interventions (VBI) (5-10 minutes). As a final point, the article will also briefly explore the role of internet-based interventions to address whether a VBI for cannabis users could be delivered to an extended audience through new technologies.

Brief interventions (BI)

By definition, a BI is a time-limited, patient-centred approach aimed at raising awareness and insight into potentially health-limiting behaviour and encouraging behavioural change before more serious consequences develop.^{41,42} BIs have been applied within the substance use field and commonly refer to strategies based on motivational interviewing, harm reduction, and the stages of change to motivate substance users to take action towards reducing their problematic substance use.^{43,44} With these underlying principles in mind, BIs are not intended to treat addiction, but rather provide the opportunity for an early intervention with individuals in the general population who may be at risk of developing a substance use disorder.⁴⁵ Thus, they are often delivered opportunistically within general healthcare settings or other community services. In this circumstance, a healthcare professional, who is not a specialist in addiction, delivers a BI to an individual who may report the potentially harmful use of a substance, but is not necessarily seeking treatment for a substance use problem or dependence. BIs can therefore vary widely in their goals (reducing use versus abstinence), length, content, and intensity — requiring any time from a few minutes for a healthcare professional to provide brief advice, to several sessions of specialised counselling.^{42,46}

A common approach to the delivery of BIs is the FRAMES model developed by Miller and Sanchez.⁴⁷ This model, based upon the motivational interviewing style, recommends that individuals are: provided with feedback about their risk of problems resulting from their behaviour; encouraged to take responsibility for their behaviour; provided with clear advice on how to reduce or change their behaviour; assisted to identify a menu of options for achieving behavioural change; treated with empathy and understanding; and develop self-efficacy for achieving change. The aim is to enhance the patient's motivation and readiness for change by helping them identify the risks of their behaviour and to resolve ambivalence about change.^{43,47} This approach has been found to be particularly appealing to resistant populations, including substance users, who may not recognise their behaviour as problematic, are not ready for change, or are afraid of stigmatisation.⁴⁴

The evidence

A large body of research has accumulated in support of BIs, with the majority of studies focusing on excessive use of alcohol and tobacco — BIs for illicit drug use have been studied considerably less.

Alcohol: In the first systematic review of BIs targeting alcohol use, Bien, Miller, and Tonigan⁴⁸ reviewed 32 studies involving over 6000 participants in various healthcare settings. It was found that BIs with problem drinkers were more effective than no treatment, and often as effective as more extensive treatment. More recently, Kaner and colleagues⁴⁹, based on their review of 21 randomised controlled trials (RCTs), concluded that BIs, when conducted in primary healthcare

settings are effective in reducing alcohol consumption by an average of four standard drinks per week. BIs have also been shown to reduce the occurrence of alcohol-related problems, morbidity⁵⁰, and healthcare utilisation.⁵¹ Due to their nature and brevity, BIs have been described as a feasible and cost-effective prevention approach for reducing alcohol misuse in outpatient and primary care settings.^{52,53} Outcomes of BIs, however, appear to vary depending on the severity of the problem, with best results seen with at-risk or harmful drinkers compared to those with more severe problems and dependence.⁵⁴ Although there is some evidence suggesting that BIs can be of some benefit to patients with alcohol dependence.⁵⁵


Tobacco: BIs for smoking cessation have also been found to be highly effective. A UK study compared a ten-minute motivational intervention versus two minutes of brief advice given by general practitioners on smoking cessation⁵⁶. They found that the intervention had a significant effect over brief advice on various measures of smoking reduction at the six-month follow-up. Better results were found among pre-contemplators who were more likely to advance to a more ready stage of change. This finding highlights the importance of delivering BIs to those who may not be inclined to disclose or change their potentially harmful substance use. Stead and colleagues⁵⁷ systematically reviewed 42 clinical trials conducted since 1972 and found that doctors' brief advice to patients to quit smoking increased the likelihood of a cessation attempt, as well as abstinence at the 12 month follow-up. They also found an additional benefit of more intensive advice on quit rates.

Illicit drug use: In contrast to the literature on alcohol and tobacco, much less research has been conducted on the efficacy of BIs for illicit drug use. In a RCT conducted by the World Health Organization⁵⁸, a BI resulted in significant short-term reductions (≤ 3 months) in illicit drug use. Bernstein and colleagues⁵⁹ conducted a RCT of screening and BI with adult out-patients with cocaine or heroin use. Those who screened as at-risk were randomised to receive either a brief negotiated interview delivered by peer-educators or written advice and referral. They found the BI successfully facilitated abstinence from cocaine and heroin use at six months compared to controls. Saunders et al⁶⁰ also found a brief motivational intervention delivered to opiate users attending a methadone program to be effective in increasing participants' compliance with treatment and motivation to quit drug use, as well as reducing the number of reported drug-related problems and rate of relapse. Although there is growing evidence in support of BIs for a range of illicit substances, some studies have failed to find significant effects.⁶¹ A recent systematic review of BIs for non-treatment seeking psychoactive substance users concluded that the evidence for their effectiveness is currently limited and inconclusive.⁶²

Brief interventions for cannabis users

Despite mounting evidence about cannabis dependence and the harms associated with regular cannabis use, research continues to show that cannabis users exhibit low levels of motivation to quit, have low perceived treatment need, and are concerned about stigma associated with accessing treatment.⁶³ Consequently, cannabis users are less likely to attend treatment. BIs have demonstrated effectiveness with hazardous alcohol use, and are showing promise with other illicit substances. Thus, it is possible that similar interventions could be suitable for addressing cannabis use. BIs have recently been developed for cannabis use in an attempt address the gaps in treatment engagement, and a small number of studies have been conducted with promising results.⁶⁴⁻⁶⁸

In the first RCT assessing a BI for cannabis users, Stephens and colleagues⁶⁸ found two 90 minute individual sessions comprising assessment, personalised feedback, and advice to be as effective as more extensive treatment and more effective than no treatment in reducing cannabis use and related problems. Walker and colleagues⁶⁹ also found two sessions of motivational enhancement therapy delivered to adolescent cannabis users resulted in reduced cannabis use and fewer



negative consequences at 12 months compared to a delayed-treatment control group. While demonstrating good efficacy, these approaches are more intensive than an ideal ‘brief model’ and may be too long to be applied in a variety of settings. To address this, a study was conducted with treatment seeking adults, whereby participants were randomised to receive either a 6 session cognitive-behavioural intervention (CBT), a 1 session CBT intervention (90 minutes), or a delayed treatment control group⁷⁰. The authors reported significantly better outcomes among participants receiving either intervention compared to those in the delayed treatment control group. Participants receiving either the one or six session intervention were more likely to report abstinence at follow-up, were significantly less concerned about control over their cannabis use, and reported fewer dependence symptoms and associated problems. However, the 6 session intervention was found to be more effective than the one session intervention on measures of cannabis consumption and dependence. Nevertheless, the study provided initial support for the feasibility and effectiveness of a single-session intervention for cannabis use. Further support also comes from a study conducted with 200 young non-treatment seeking illicit-drug users (aged 16-20 years) who were randomly allocated to either 1 session of motivational interviewing (up to 60 minutes) or a non-intervention control condition.⁷¹ In comparison to the control group, those randomised to the BI significantly reduced their use of cannabis at 3 months follow-up, with the effect shown to be greater among heavier users. However, after 12 months this effect had disappeared (72). Another study conducted with frequent cannabis users found a single-session BI (20-30 minutes), delivered either verbally or in written format, produced significant reductions in cannabis-related risk behaviours, such as deep inhalation and driving while under the influence of cannabis, which were maintained one year later.⁷³

Research has also begun examining the minimal time necessary to deliver effective cannabis use interventions. In a simple single-group pre-post design, Denering and Spear⁷⁴ found screening and a brief 10-15 minute intervention delivered to college students resulted in reductions in the proportion of students reporting cannabis use at six months. In another study investigating a brief 5-10 minute intervention delivered in a free walk-in STI clinic, as part of the international WHO ASSIST (Alcohol, Smoking and Substance Involvement Screening Test) Project, researchers found a trend toward reduced cannabis use among participants, though this effect did not reach statistical significance⁷⁵. However, they did find significant effects for other substance use, and therefore suggested this result may have been more reflective of the small sample size of cannabis users and a lack of statistical power, rather than a lack of efficacy. Other studies have found positive effects of BIs in reducing adolescent cannabis use. For example, a 15-minute brief motivational intervention targeting alcohol and drug use was divided into three, five minute segments and delivered to young people (aged 12-18 years) in primary care⁷⁶. The first five minutes addressed the patient’s motivation to change; the next five minutes was spent enhancing it; and the last 5 minutes were designated to coming up with a plan of action. At the three month follow-up, researchers found that those who received the intervention reported significantly reduced cannabis use, lower perceived prevalence of cannabis use, lower intentions to use cannabis in the next six months, and reported they had fewer friends who used cannabis compared with those who received only standard care.

Brief intervention in the emergency department (ED)

Most BI studies have been conducted in primary care settings. However, the ED has been posited as an opportune environment in which to deliver BIs. Visits to the ED are often associated with substance use, and ED patients are more likely than primary care patients to report the use of illicit drugs.^{77,78} Rockett and colleagues⁷⁷ found 31% of ED patients screened positive for recent substance use (past 30 days) and as many as 27% had unrecognised and unmet substance use treatment needs – less than 10% actually received necessary treatment. Other research has suggested that up to 41% of ED patients screen positive for illicit substance use (most commonly cannabis).⁷⁹ Recent data also shows there has been a 59% increase in cannabis-related ED visits in


the US since 2006.¹ In Australia, EDs manage a variety of substance use-related illnesses and injuries, and it is estimated that cannabis use is responsible for approximately 16% of all illicit drug related hospital costs—second only to opioids.⁸⁰ However, identification and intervention of patients in the ED with problematic cannabis use is not currently incorporated into routine care.

Like most BI research, the majority of ED studies have targeted alcohol consumption. Gentilello and colleagues⁸¹ demonstrated significant reductions in alcohol use from baseline to 12-months follow-up among injured adult patients admitted to a trauma centre (though there was considerable loss to follow-up). In one of the first RCTs of a BI conducted in the ED, Longabaugh and colleagues⁸² showed that patients who received a BI plus booster session had significant reductions in alcohol-related harm compared to a standard care control group. However, actual reductions in alcohol use between groups failed to reach significance. In contrast, in a non-randomised study involving 14 ED sites, patients with a positive screen for risky alcohol use were allocated to receive either an intervention, consisting of a brief negotiated interview lasting 15 to 20 minutes, or a written handout (control group). At the three month follow-up participants in the intervention group reported consuming on average 3.25 fewer drinks per week than control participants.⁸³ Further, at-risk drinkers appeared to benefit more from the BI than dependent drinkers. At the six and 12 month follow-up time points, however, the intervention effects seen at 3-months had weakened and were no longer statistically significant.⁸⁴ Two recent reviews of ED-based BIs targeting alcohol use have been conducted. Based on the meta-analytic review of 13 studies, Havard, Shakeshaft, and Sanson-Fisher⁸⁵ concluded that the effects of an ED BI on quantity and frequency of drinking is inconclusive, though there is supporting evidence to suggest they can reduce alcohol-related injury. Looking at an overlapping but different set of studies, Nilsen and colleagues⁴² reviewed 14 studies of ED-based BIs for injured patients. They concluded that, in general, there was a positive effect of BI on reduced alcohol consumption and alcohol-related injury among injured patients.

Very few studies of BIs for substance use other than alcohol have been tested within the ED setting. Promising results were shown in one study conducted with facial injury patients in a trauma care centre.⁸⁶ Following a brief assessment procedure for substance use, patients were randomly assigned to a brief two-session personalised motivational intervention or a health information control condition. During the 6 month follow-up period, intervention participants showed statistically significant declines in drug use. This effect appeared to be moderated by drug use severity and motivation to change, with greater effects seen in those with greater drug use dependency and higher motivation scores at baseline. Woolard and colleagues⁷⁸ also found significant reductions in the patterns of conjoint alcohol and cannabis use among ED patients who received a motivational BI with a booster session, compared to patient controls who received standard care. They reported that intervention participants reduced the number of days in which they used alcohol and cannabis together by an average of 5 days per month compared to the standard care group who reduced their conjoint use by only 1.25 days on average. This intervention effect was sustained over the 12 month follow-up period. In the only study to date to investigate the effects of a BI (20 minutes) in the ED designed specifically to reduce cannabis use among adolescents and young adults (14-21 years), Bernstein and colleagues⁸⁷ found promising results. Compared to a standard-assessed control group, BI participants were more likely to be abstinent for the past 30 days at the time of follow-up and showed a greater reduction in days of cannabis use from baseline to 12 months.

Screening and assessment: a very brief intervention

In the course of investigating the efficacy of BIs, speculation has developed that the screening and assessment procedure integral in research designs may itself constitute a type of intervention and may provoke contemplation about use.^{88,89} Assessment typically involves asking about levels of substance use and experienced consequences, and feedback of this information may have direct effects on self-change by raising awareness of a person's use and adverse effects. As Moos⁹⁰



explains, “Assessment can raise an individual’s awareness and lead to recognition of a discrepancy between current behaviour and a personal or a normative standard. This discrepancy may communicate implicitly personal responsibility and impel a need for change...” (p.249).

As the average duration of most BIs often extends beyond the 20 minute time-point, this may be less than realistic for most healthcare settings, particularly within the ED.^{49,91} Screening and assessment are less complex procedures than any BI, and can be self-administered or performed by staff at all levels. The circumstance that screening or assessment might produce a positive effect, with or without a following intervention, has been termed ‘assessment reactivity’. In a recent study, Worden and McCrady⁹² compared the effectiveness of an assessment plus feedback intervention versus assessment only in a clinical population where the subjects were breathalysed at intake and randomly during the study to insure they were meeting the inclusion criteria. The assessment was the Addiction Severity Index, a semi structured hour-long interview. This study failed to find differential effectiveness between groups on reported outcome measures at 30-days follow-up, which leaves open the possible explanation that the intake procedure and monitoring via breathalyser might have been responsible for the positive changes seen over time in both groups. Similar results were also found for very brief screening for alcohol use in a population of dependent opiate and cocaine users.⁹³ The administration of a brief alcohol screener with minimal feedback was found to be as effective as a 15-minute BI at follow-up. Further, in a large sample of adult primary care patients, Kaner and colleagues⁹⁴ found no evidence that a 20-minute counselling session added additional benefit in reducing harmful drinking in comparison to brief screening with feedback. Two recent reviews have investigated assessment reactivity to partially explain the positive changes observed among control groups, and both have identified preliminary evidence suggesting assessment questions might indeed trigger a thought-provoking process that might influence substance use outcomes at follow-up.^{88, 89}

To specifically test assessment reactivity, McCambridge and Day⁹⁵ compared a fully assessed control group (using the Alcohol Use Disorders Identification Test (AUDIT) 10) with a minimally assessed control group (using a health survey including one alcohol use question). At follow-up, conducted 2-3 months later using the AUDIT 10, the fully assessed group showed lower AUDIT scores than the minimally assessed group by an average of 1.4 points – an effect size of $d = 0.23$. Another study comparing fully versus minimally assessed control groups also found a greater reduction in AUDIT 10 scores (mean 1.6 points) among fully assessed participants compared to those who received only minimal assessment.⁹⁶ Other studies, however, have found no such effect.^{97,98} For example, D’Onofrio and colleagues,⁹⁸ investigated the impact of baseline assessments on alcohol use outcomes using a standard care-assessed control group and a no-assessment group. No significant differences on alcohol use outcomes between the two control groups were reported.

While the literature on this issue is mixed, and research on cannabis use specifically lacking, there is preliminary evidence to suggest that minimal screening procedures with validated and reliable instruments might play a role in substance use behaviour change.^{88,89} There may be value in implementing screening instruments that are capable of detecting heavy cannabis use or cannabis-related problems. Several brief instruments are available for routine use in clinical settings as well as in general populations (for example, the Cannabis Use Disorders Identification Test; The Cannabis Use Problems Identification Test; the ASSIT and ASSIST-LITE). Brief assessment scales may have the potential to be a time- and cost-effective opportunity to address harmful cannabis use, reducing the need for more extensive treatment techniques. Further research in this area will be important.

Internet-based interventions

A further step in developing time efficient and effective interventions for substance use, including cannabis use, has been the development of electronically-mediated and internet-based platforms – also known as eHealth interventions.⁹⁹ A review of eHealth interventions for substance use found that demand exists for this mode of delivery and the likelihood of its effectiveness and impact could be considerable.¹⁰⁰ eHealth technologies have several advantages over traditional face-to-face interventions, such as being a cheaper, more flexible, and more accessible alternative, especially for younger users.⁹⁹ Another clear advantage is its ability to overcome issues of anonymity and stigma; issues which have been shown to be major difficulties of face-to-face treatment.^{63,101}

There is growing popularity for the use of eHealth interventions aimed at changing health-related behaviours. A recent meta-analysis of 22 RCTs showed that there is sufficient clinical evidence to support electronically-mediated smoking cessation interventions.¹⁰² Similarly, there is growing evidence for the use of internet interventions in addressing problematic alcohol use.^{103,104} A systematic review of internet- and computer-based programs for the prevention of illicit drug use among the general population has also found promising results.¹⁰⁵ Of the 10 studies reviewed, 5 focused specifically on universal drug prevention and together suggested that such interventions may be effective in preventing initiation to recreational drug use in the short- to mid-term (<12 months). The other five studies included in the review targeted current recreational drug users with the aim of reducing use. Again, it was concluded that eHealth programs can positively influence drug use outcomes; though the findings were somewhat less consistent with this population.

eHealth interventions have been used as an adjunct to practitioner-delivered BIs in healthcare settings and involve screening followed by personalised feedback conducted on an electronic device. The intervention phase may be conducted with a practitioner or incorporated within the electronic program.^{106,107} An example of this hybrid procedure is demonstrated in a study by Harris and colleagues¹⁰⁸ in which face-to-face brief advice (2-3 minutes) following a computerised screening and feedback procedure was performed with adolescents (aged 12-18 years) in primary care settings in the US and Czech Republic. This study measured alcohol and cannabis use, initiation, and cessation rates at baseline, and at three and 12 months follow-up. Results found that compared to treatment as usual, intervention participants at the US site significantly reduced their use of alcohol at both follow-up time points, and those at the Czech site reduced their cannabis use. While the effect of the intervention on cannabis use was in the hypothesised direction in the US, it did not reach statistical significance, possibly because of the low prevalence of cannabis users in the sample. Efficacy of computer-assisted interventions, with and without therapist contact, has also been demonstrated in the workplace and college settings.^{109,110}

Attempts to reach out with internet-based interventions to the general population outside of healthcare or research-specific settings have also been made. Stand-alone internet-based interventions (those with limited or no mediation by a therapist) offer the potential advantage of being available to individuals at any time, allowing access to information when and where it is needed and as often as required.¹¹¹ In a RCT, Spijkerman and colleagues¹¹² found a 15-minute web-based intervention consisting of a screener on drinking patterns, motives, and health status, followed by personalised feedback, was associated with significant reductions in weekly intake of alcohol among 15 to 20 year old binge drinkers, with a stronger effect among males. The efficacy of web-based cannabis treatment programs has been demonstrated with adult cannabis users expressing a desire to quit or reduce their use. Tossman and colleagues¹¹³ tested the effects of a therapist-assisted web-based treatment program for cannabis use in a randomised trial, finding significant effects on cannabis use reductions. Another study compared an information-only control group to participants who received a self-guided web-based intervention (114). Those in the intervention group reported significantly fewer days of cannabis use during the past month,

significantly fewer and less severe cannabis dependence symptoms, and significantly fewer symptoms of cannabis abuse at the three month follow-up.

On the other hand, research examining brief single-session web-based interventions for cannabis use is extremely limited and studies conducted with college-age populations have shown mixed results. A 20-minute web-based BI, The Marijuana eCHECKUP TO GO (e-TOKE) has been subscribed by numerous universities in the US to address college students' cannabis use, consequences and perceived norms, and provides recommendations for preventing or decreasing cannabis use. A study of the effectiveness of a modified version of the e-TOKE program as a prevention initiative for non-using college students found those who completed the program (compared to an assessment only control group) had lower descriptive (perceptions of others' cannabis use) and injunctive norms (perceived approval of cannabis use) at 1-month follow-up.¹¹⁵ However, rates of initiation did not significantly differ between the two groups during the follow-up period. In another study by the same research team evaluating the effectiveness of e-TOKE in a group of current cannabis users, similar results were also found.¹¹⁶ Those completing the intervention reported lower perceptions of peers' cannabis use, but no group differences in cannabis use frequency, problems, abuse, or dependence symptoms were reported. A RCT of a similar web-based BI delivered to young people transitioning from high school into college found no main effect on cannabis use or negative consequences. However, moderator analyses suggested that those higher in contemplation about changing their cannabis use and those with a family history of substance abuse may be two sub-populations that might benefit from the intervention.¹¹⁷

A meta-analysis of the literature regarding internet- and computer-based interventions for cannabis use has recently been conducted.¹¹⁸ Albeit the limited data currently available and the diversity of programs and populations which have been studied, it was concluded that web-based interventions have a small but significant effect ($g = 0.16$) on reducing cannabis use, at least in the short-term, and can be effective as a prevention measure or as targeted treatment programs. On the basis of this limited, yet growing evidence, it is clear that further research is warranted.

Future research directions

The evidence supports the need for the development and implementation of evidenced-based BIs for cannabis users, and in particular, for those who may not recognise their use as problematic or be ready for change. BIs can offer an important opportunity to engage patients in a discussion of their cannabis use and related problems, with the aim of motivating behaviour change. Indeed, BIs have demonstrated promising results in their ability to reduce cannabis use, increase rates of abstinence, and reduce the number of reported dependence symptoms and cannabis-related problems.^{30, 38, 68, 70} However, research is urgently needed to confirm the findings of earlier studies, as well as identify the optimal conditions for delivery. Further research in this area will help to advance efforts to reduce cannabis use and prevent the harms associated with its regular and heavy use.

A critical focus for future research will need to be on the possible factors that influence the longer-term effects of BIs. Studies of BIs for cannabis use have generally failed to find extended positive effects on consumption beyond a promising improvement in the first few months.^{30, 38} A major reason for this has been the short-term focus of the majority of BI studies (3 to 6 months; with a few exceptions). Some have suggested the potential utility of booster sessions to sustain intervention effects over the longer-term.⁶⁴ Few intervention designs have compared the effects of booster sessions and have found that they may not offer additional benefit in the short-term,⁷⁶ but their effect on longer-term outcomes are yet to be properly investigated. A further challenge will also include the exploration of the possible mechanisms responsible for behaviour change. Due to the vast heterogeneity that currently exists between studies, there is uncertainty about the mechanisms by which BIs may be successful. For example, is it the clinician, the setting, the

specific intervention components, the format of the intervention, or a combination of these that give the optimal experience to encourage change? In line with this, future studies will also need to examine the groups for which BIs might have greater or lesser effectiveness. Studies should also include elements that can inform real-world effectiveness, which would better inform translation into practice.

Cannabis-related problems are often evident in the ED, and this environment has great potential for the identification and intervention of at-risk cannabis users. Although such potential may exist, most BIs may not translate to, or be practical for delivery, within the ED. Thus, there is a clear and justified need for trials investigating the efficacy of VBIs for cannabis use. Evidence has suggested that screening and assessment may mimic a BI among control group participants, and therefore promote small, yet significant, behaviour change.^{88,90} With the careful selection of assessment questions based on their behaviour change potential, it may be possible for VBIs to be employed in this shortest form to urge people to acknowledge their problematic cannabis use and begin to consider change. Such a VBI, if effective, would be well suited to a range of time-pressured settings. However, the minimum length of a VBI for cannabis use presently remains an open question, but will be an important factor to understand. The shortest intervention shown to have significant results for cannabis use has been approximately 20 minutes;^{76,87} though the evidence from the overall literature suggests that an effective procedure could take less time. In particular, research from smoking cessation indicates that VBIs as short as 3-5 minutes might have a significant effect.⁵⁷

Research into brief eHealth interventions for cannabis use is also in its very early stages, and further investigation into the development of evidenced-based BIs that do not rely on face-to-face interaction will be needed for this area of research to advance. Nonetheless, the advantages of eHealth interventions are potentially great. Whether they are incorporated into a healthcare visit, or available to the general population via the internet, web-based interventions offer a private and readily accessible alternative to traditional treatment and have a greater potential to reach a much larger audience. Evidence of the effectiveness of web-based strategies is accumulating, with some effects shown to be comparable to interventions delivered face-to-face.¹⁰²⁻¹⁰⁵ Based on these findings, it can be expected that web-based BIs for cannabis use could also be effective. At the very least, a brief assessment procedure done electronically within a healthcare setting might be a viable solution to get individuals to consider their use or engage in more intensive treatment.¹⁰⁸ Such a strategy may also offer a more practical mode of delivery within the ED setting.

Conclusion

Given the high prevalence of cannabis use, and the reluctance of users to engage in treatment, VBIs delivered in the ED could constitute a key intervention strategy in the attempt to prevent cannabis dependence among at-risk users. VBIs have several advantages over traditional treatment, such as their ability to be easily implemented and universally delivered without the need of specialist staff. Indeed, there is growing evidence that VBIs for substance use problems can be effective. Less evidence is available regarding cannabis use, but several studies are suggesting positive results. While BIs (> 20 minutes) have been found to reduce cannabis use and associated problems in both treatment and non-treatment seeking adults and adolescents, more research will be needed before VBIs (5-10 minutes) for cannabis use can be implemented as an evidenced-based intervention strategy.

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