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E-health and m-health: using new technologies to respond to drug problems

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E-health and m-health: using new technologies to respond to drug problems

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Summary

This paper presents a definition of e-health and m-heath tools to address substance use problems, and a taxonomy to describe such tools systematically. A number of examples of e-health tools that are currently being used in Europe for prevention, treatment and harm reduction of substance use are presented, based on a selective literature search. Recent reviews and other studies on the effectiveness of e-health tools are discussed. Most of the available research has focused on the reduction of cannabis use, alcohol moderation and smoking cessation, and to a lesser extent on reducing use of stimulants and opioids. The paper concludes with a number of future challenges for the wider implementation of e-health and m-health for substance use problems in Europe.

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Introduction

Advances in new technologies and the ubiquitous availability of the internet have provided many new possibilities for addressing a wide array of health problems, including substance use problems. The use of digital (computer-based) technologies for health is referred to as 'e-health' (WHO, 2016a). Examples of health practices supported by e-health are the treatment of patients (via internet or computer-based interventions for substance use disorders — SUDs), education of SUD treatment professionals (using e-learning modules on therapeutic techniques) and patient monitoring (e.g. digitised substance use diaries to monitor substance use behaviour as part of SUD treatment).

Mobile digital technologies to support health practices are referred to as 'm-health'. M-health is an abbreviation of mobile health, and encompasses all programmes accessible through mobile devices such as smartphones and tablets (WHO, 2016b). M-health is conceptually nested within e-health, in the sense that e-health is an overarching term for digital health technology, including m-health. Therefore, wherever e-health is mentioned in this paper, m-health is implicitly included as well.

There are a number of perceived advantages to the use of e-health. The most prominent include the possibility of enhancing access to evidence-based treatment and information, improving the implementation of interventions among new target populations and tailoring treatment or information to specific populations and individual needs (see, for example, Shoemaker and Hilty, 2016). The perceived anonymity of e-health interventions could make it easier to reach populations that fear stigmatisation (e.g. illicit drug users, high-functioning alcohol misusers; see Postel et al., 2005). Another possible advantage of e-health is the increased patient-centredness of interventions; the patient can decide to work with an e-health intervention at any time of day, instead of having to wait until his/her next appointment with a professional — hence fostering self-management. In addition, e-health offers possibilities for interactive contact between providers and users, and between professionals and patients. From a healthcare management perspective, the accumulating evidence for the cost-effectiveness of e-health interventions (Donker et al., 2015) is worth mentioning.

Despite these advantages, the majority of healthcare professionals state that e-health applications are poorly or not at all implemented in their healthcare setting (Murray et al., 2011). Challenges to the uptake of e-health include the fact that it is less well able to reach populations with lower computer/smartphone ownership rates (digital divide) — although this challenge may be addressed in part by m-health, given the accumulating worldwide smartphone penetration rates (Pewglobal, 2016). E-health applications may often also be less suitable for people who have reading problems, because of its (often) textual nature.

To stimulate the understanding and use of e-health in responding to drug problems in Europe, in this paper we will address the following questions: (1) How can e-health and m-health interventions be comprehensively classified and described?; (2) How is e-health currently used to respond to drug use problems in Europe?; and (3) What is known about the effectiveness of e-health interventions for drug use problems?

Method

A selective literature search was carried out. Recent and well-known taxonomies for e-health interventions are presented, which can serve as starting points either to describe and evaluate existing e-health interventions and tools or to develop new ones. Examples of European e-health

interventions for drug problems give an indication of the diversity of target groups, modes of delivery, settings and intervention types (harm reduction, treatment and prevention). A comprehensive review of the effectiveness of e-health for drug problems based on recent systematic reviews is presented.

Taxonomy of e-health interventions

E-health can target a broad range of substance use behaviours and is applied in various preventive, curative treatment and harm reduction interventions. As the use of e-health interventions continues to evolve, interventions become increasingly diverse in content, target, intensity and type of technology. Standardised descriptions of behaviour change techniques enhance specification, evaluation and implementation of internet-based interventions (see Hekler et al., 2016). There are a number of taxonomies, frameworks and guidelines that can be used to categorise existing e-health interventions, or which can be helpful in the development of new interventions.

Litvin et al. (2013) proposed a framework for e-health interventions specifically designed for SUDs. This framework helps to evaluate and develop e-health interventions for SUDs by providing choices in four main categories: accessibility (setting/location, type of technology), usage (duration, exposure, attrition), human contact (asynchronous, synchronous, clinician, peers) and intervention content (static, dynamic, tailoring, theory/orientation).

A recent study validated a comprehensive list of e-health intervention characteristics using expert opinions, with the aim of creating a classification system in which e-health intervention characteristics can be described consistently and comprehensively (Bewick et al., 2017). Ten characteristics were considered of key importance to describe e-health interventions. Six of these were descriptive aspects on which e-health interventions may vary: behavioural target, target population, underpinning behaviour change technique, type of technology used (e.g. mobile technology), intended setting for the intervention and whether or not there are costs associated with the intervention for the end user. Four characteristics were quantifiable: the intended duration of the intervention (single session or multiple sessions over time), the extent to which the intervention content was informed by theory (e.g. self-affirmation theory, theory of planned behaviour), the extent to which contents of the intervention are tailored to specific needs of the end user and the extent to which the intervention includes counsellor involvement. The list is intended as a tool to describe existing e-health interventions and to guide discussion during the development of new e-health tools. In addition, it provides a perspective on the various dimensions on which e-health interventions may vary.

A more extensive taxonomy has been developed by Michie et al. (2013). They developed a hierarchical taxonomy consisting of 93 behaviour change techniques (BCTs) to standardise descriptions of active intervention components, through several international consensus exercises. Each BCT is an irreducible, observable and replicable component that can be compared across studies. The BCTs are clustered into 16 groups (Table 1). The left-hand column of Table 1 presents the 16 groups of BCTs, while the right-hand column gives an example from each of the 16 groups. An intervention may contain modules corresponding to one or more of the BCTs. Online training (www.bct-taxonomy.com) and workshops (http://www.ucl.ac.uk/behaviour-change) are recommended to gain familiarity with this taxonomy and to use it accurately in the development and evaluation of complex behaviour change interventions.

Although this taxonomy system is not specifically developed for e-health interventions, its focus on identifying effective behaviour change elements makes it very relevant for e-health intervention developers.

In addition to taxonomies focusing on the contents of interventions, professionals who want to develop e-health interventions could consult the guideline developed within the Click for Support network, an EU-funded international project (LWL, 2015). One of the main objectives of this project was to develop a guideline for the development and implementation of effective web-based interventions for young people using illicit drugs. The guideline focuses on four themes: (1) aspects to consider before starting the development of an e-health intervention (such as exploring the needs of the target group prior to development, e.g. through focus groups); (2) technical aspects of e-health development (e.g. data security and user anonymity — application of European Union (EU) regulations on data protection, as well as relevant national regulations); (3) the appropriate use of interactive elements (e.g. to be more attractive to young people, include fun elements such as apps or games); and (4) specific aspects to extend the reach to young drug users (e.g. involve the target group in promoting the website). The first version of the guidelines was launched in 2015 (LWL, 2015); an update is planned in 2018.

Table 1. Groups with example behaviour change techniques (BCTs) in BCT Taxonomy v1 (Michie et al., 2013; see also http://www.bct-taxonomy.com)

Behaviour change technique number	**Group of behaviour change techniques**	**Example intervention module**	**Definition of example behaviour change technique**
1	Goals and planning	Behavioural contract	Create a written specification of the behaviour to be performed, agreed by the person and witnessed by another
2	Feedback and monitoring	Self-monitoring of behaviour	Establish a method for the person to monitor and record their behaviour(s) as part of a behaviour change strategy
3	Social support	Social support (practical)	Advise on, arrange or provide practical help for performance of the behaviour
4	Shaping knowledge	Instruction on how to perform the behaviour	Advise or agree on how to perform the behaviour
5	Natural consequences	Information about health consequences	Provide information about health consequences of performing the behaviour
6	Comparison of behaviour	Demonstration of the behaviour	Provide an observable sample of the performance of the behaviour, directly in person or indirectly
7	Associations	Prompts/cues	Introduce or define environmental or social stimulus with the purpose of prompting or cueing the behaviour. The prompt or cue would normally occur at the place of the performance
8	Repetition and substitution	Behaviour practice/rehearsal	Prompt practice or rehearsal of the performance of the behaviour one or more times, in a context or at a time when the performance may not be necessary, to increase habit and skill
9	Comparison of outcomes	Pros and cons	Advise the person to identify and compare reasons for wanting (pros) and not wanting to (cons) change the behaviour
10	Reward and threat	Material incentive (behaviour)	State that money, vouchers or other valued objects will be delivered if and only if there has been effort and/or progress in performing the behaviour
11	Regulation	Pharmacological support	Provide, or encourage the use of or adherence to, drugs to facilitate behaviour change
12	Antecedents	Distraction	Advise or arrange to use an alternative focus for attention to avoid triggers for unwanted behaviour
13	Identity	Identification of self as a role model	State that one's own behaviour may be an example to others
14	Scheduled consequences	Behaviour cost	Arrange for withdrawal of something valued if and only if an unwanted behaviour is performed
15	Self-belief	Self-talk	Prompt positive self-talk (aloud or silently) before and during the behaviour
16	Covert learning	Imaginary reward	Advise the person to imagine performing the wanted behaviour in a real-life situation followed by imagining a pleasant consequence

Examples of e-health applications for substance use in Europe

In this section, a number of examples of e-health and m-health applications to address various aspects of substance use will be presented. These are selected examples of applications used in an indicated prevention context, in the context of substance use treatment, as well as examples of harm reduction tools, to give an indication of the types of e-health tools that have been used and developed over the past years.

Prevention

Quit the Shit (QTS) is a German online cannabis withdrawal programme developed for adolescents aged 15-17 years who want to reduce or quit their cannabis use (Tossmann et al., 2011). In an interactive diary, users document and monitor their drug use daily, over a period of 50 days. In addition, a counselling team provides them with tips and personalised feedback at least once a week, to support users in achieving their personal goals (see Figure 1). More than 90 % of QTS users indicate that the information provided to control cannabis consumption is comprehensible and that the website is easy to use. The same is true of their experiences with their contact with the counselling team. The user feedback indicates that the central programme components — the diary and the diary comments made by the counselling team — are highly accepted and represent an efficient aid in reducing cannabis consumption. These positive assessments of individual programme elements add up to a high recommendation rate: 85 % of the participants indicates that they would recommend QTS to others. Three months after registration, users of QTS show a significantly greater reduction in consumption measures than a waiting list control group. The between-group effect sizes are moderate to large (EMCDDA, 2015).

Figure 1. Screenshot of online cannabis withdrawal programme 'Quit the Shit'.

Source: www.quit-the-shit.net

Päihdelinkki.fi is a Finnish information service and web portal for substance users, their families and their friends. It provides information and self-test modules to self-assess the severity of various substance use problems, depression symptoms and/or behavioural addictions. Self-help guides are available for alcohol misuse, gaming, use of amphetamines, cannabis use and general substance use (see Figure 2). Web service users can communicate with each other on a forum. There is also an opportunity to ask trained professionals questions on substance use.

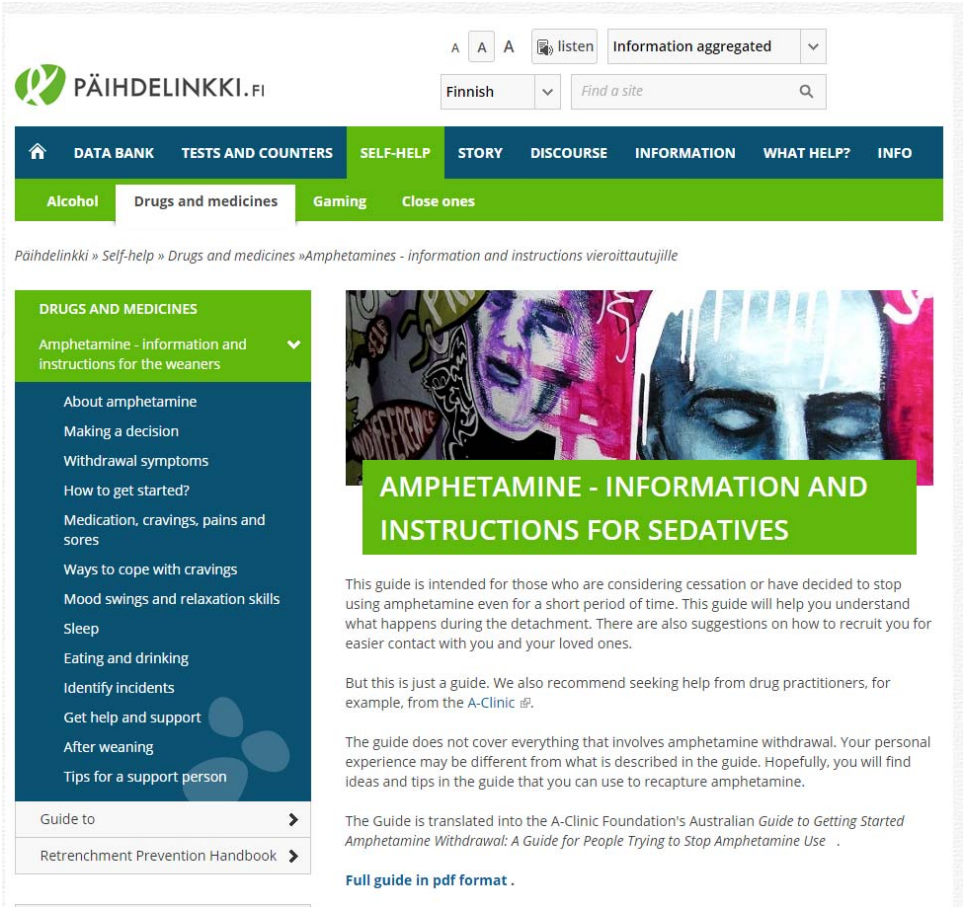

Figure 2. Screenshot of Finnish online information service on drug use and cessation of drug use (translated into English from Finnish).

Source: https://www.paihdelinkki.fi/

Mielenterveystalo.fi (English: 'Mentalhub.fi') is a Finnish mental health website. Mielenterveystalo.fi includes a module on excessive alcohol use, in addition to modules on common mental health problems such as depression and anxiety. Like Paihdelinkki, it offers information and self-tests to both website users and their families. It provides a step-by-step approach to addressing alcohol misuse and other health problems, and includes paper-and-pencil forms which can be printed and used (see Figure 3a). Mielterveystalo.fi also offers a blended e-health treatment programme in which a web therapist guides users via email through the various exercises. In addition to exercises and information, three fictional 'patients' are followed and their progress is discussed in the blended programme. The website also teaches how to tailor information to different age groups (see Figure 3b and 3c). Special sections of the website have been developed for young adolescents and for children. Here, they can access tailored self-tests, self-help information and information on professional help.

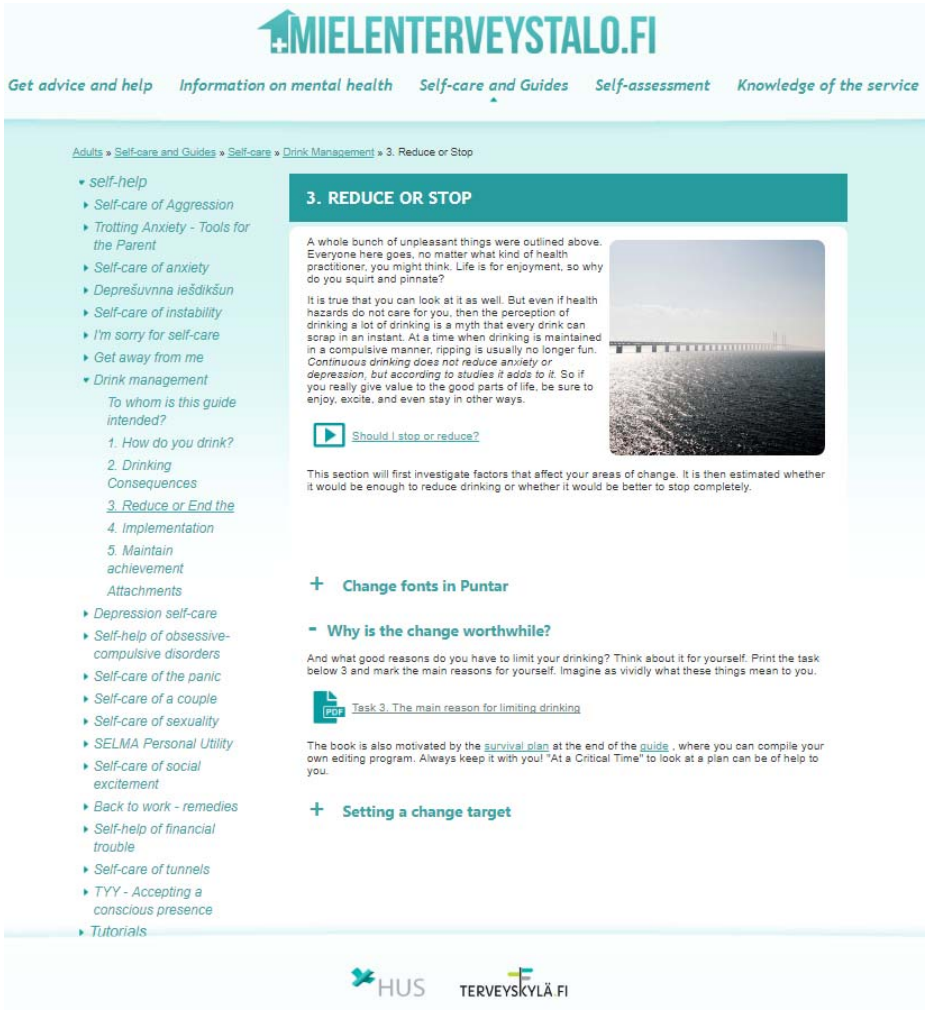

Figure 3a. Screenshot of self-help module 'Drink management' on the Finnish mental health service website Mielenterveystalo (translated into English from Finnish).

Source: https://www.mielenterveystalo.fi

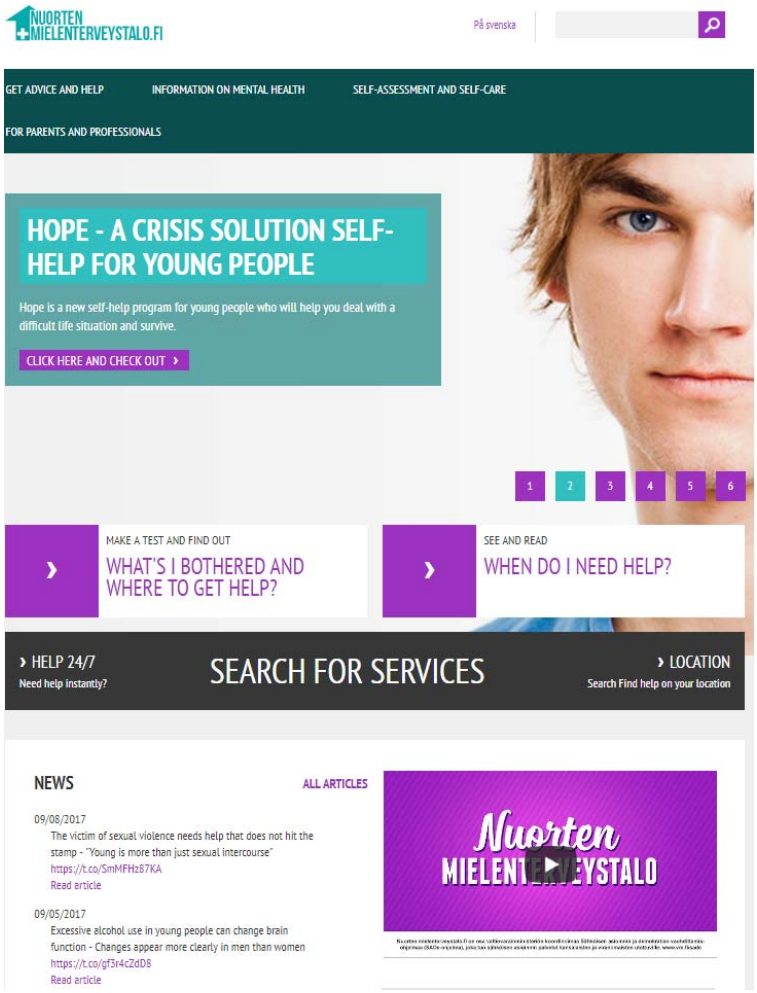

Figure 3b. Screenshot of the section for adolescents and teens on the Finnish mental health service website Mielenterveystalo (translated into English from Finnish).

Source: https://www.mielenterveystalo.fi/nuoret/

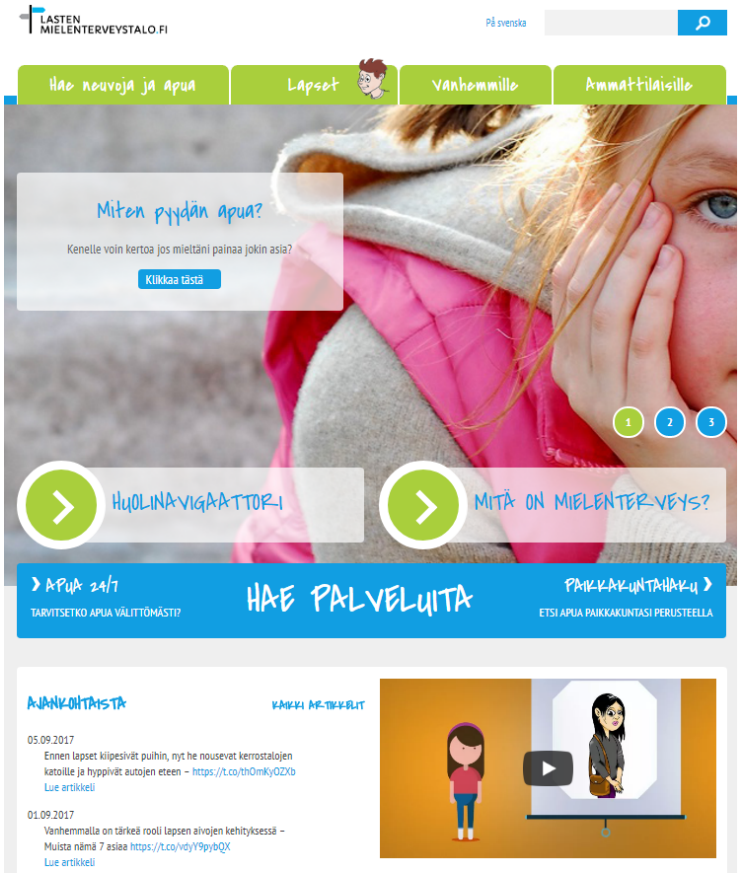

Figure 3c. Screenshot of the section for children on the Finnish mental health service website Mielenterveystalo (in Finnish).

Source: https://www.mielenterveystalo.fi/nuoret/lapset/

Treatment

The Dutch substance abuse treatment centre Jellinek has developed a number of e-health interventions for the treatment of substance use disorders. Interested individuals can fill out an online screening assessment to assess their level of risky substance use behaviour. Based on this assessment, they may be referred to various e-health treatment options. Available e-health options are fully self-guided online interventions — similar to QTS — for people with risky substance use. For those who meet the criteria for a substance use disorder diagnosis, a 'blended' programme called MijnJellinek ('My Jellinek') combines an e-health intervention with face-to-face contacts when a therapist is available (Figure 4). This blended programme has been developed to provide therapeutic support for quitting tobacco smoking, alcohol use, cannabis use, cocaine use, other illicit drug use and gambling. All MijnJellinek e-health interventions are based on cognitive behavioural therapy (CBT). In this e-health intervention, patients can read or watch videos on substance use (disorders) and associated risks, and complete/undertake their homework assignments, which are based on CBT treatment manuals. The e-health intervention also facilitates secured online messaging between patients and their therapist. Alongside the use of MijnJellinek, patients have 3-10 face-to-face sessions with their therapist (Jellinek, 2014).

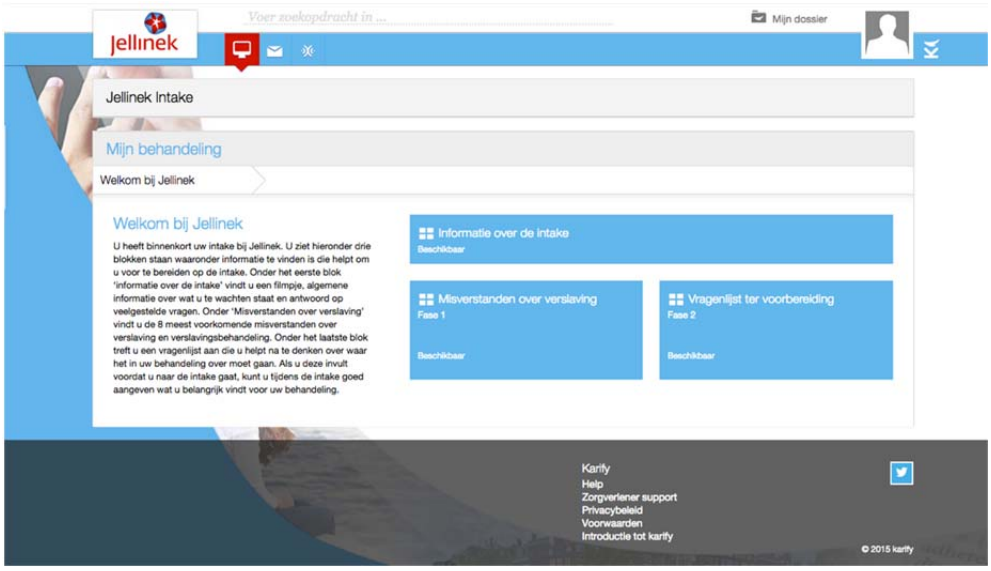

Figure 4. Screenshot of Dutch blended e-health treatment programme MijnJellinek.

Source: Jellinek.nl

ACHESS (Addiction Comprehensive Health Enhancement Support System) is an American m-health app shown to have a positive effect on problematic alcohol use (Gustafson et al., 2014). This app provides continuing care after residential treatment for alcohol use disorders, to prevent relapse (Figure 5). Among other things, it offers information and the possibility to engage in discussion groups or to communicate with experts. The app also features global positioning system (GPS) technology, tracking when a user nears a high-risk location where he or she usually consumes or buys alcohol. On such an occasion, the user receives automated support to prevent relapse (McTavish et al., 2012).

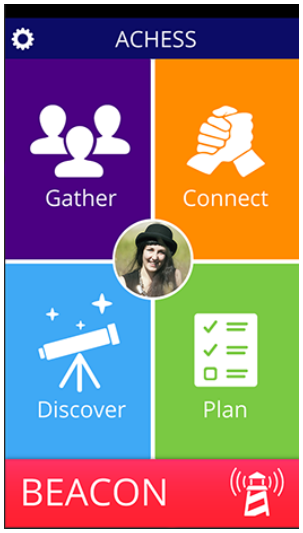

Figure 5. Screenshot of the mobile phone app ACHESS (Addiction Comprehensive Health Enhancement Support System).

Source: http://www.chessmobilehealth.com

Harm reduction

Red Alert is a Dutch m-health app developed by the Trimbos Institute in 2016. The primary aim of Red Alert is to warn substance users about extremely high-dose or contaminated ecstasy tablets that may be circulating in their area. Upon starting the app, users receive warnings about contaminated substances that may be circulating, and they can quickly access up-to-date general information on these and other substances. The app also provides information on drug-testing facilities (Figure 6). In addition, national warnings (called Red Alerts) on extremely dangerous drugs circulating in the Netherlands can quickly be conveyed to all users through push notifications: everyone who has the app installed on their smartphone or tablet will receive this notification (Trimbos Institute, 2016).

Figure 6. Screenshot of the Dutch harm reduction app Red Alert.

Source: drugsredalert.nl

The Overdose Risk Information Tool (ORION) is an e-health decision support tool for individuals who are at high risk of experiencing a drug overdose. Through a number of questions this tool calculates an overdose risk estimate of 0 (lowest) to 100 (highest), and presents this risk estimate in a visually attractive way (Figure 7). An example question is: 'Have you ever used drugs (including alcohol) when you were alone?'. After answering all questions and reviewing the risk assessment, users can change their answers to the questions to see how it affects their risk assessment. The aim of the tool is to facilitate discussion on overdose risk management between substance users and their doctors. A pilot implementation of this e-health tool was successfully carried out in multiple clinical treatment settings for substance use in four EU countries (Humphris et al., 2013).

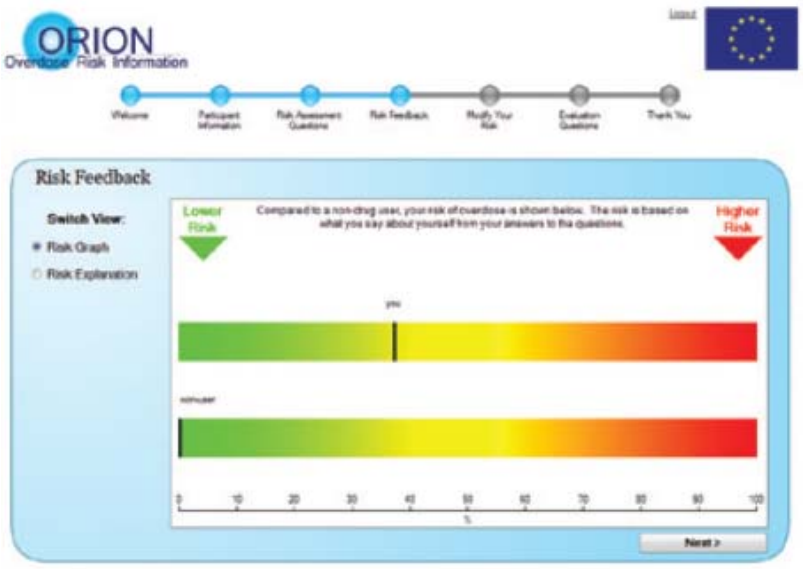

Figure 7. Overdose risk feedback screenshot from the ORION decision support tool.

Source: Humphris et al. (2013).

A somewhat similar risk assessment tool has been developed for binge drinking: Digital-Alcohol Risk Alertness Notifying Network for Adolescents and Young Adults (D-ARIANNA). This m-health app presents the user with a number of questions, then calculates the estimated risk of binge drinking based on identified risk factors. The estimated risk is displayed as a risk percentage (Figure 8). A pre-/post-test study found that users engage less in binge drinking in the two weeks following use of D-ARIANNA (Carrà et al., 2016).

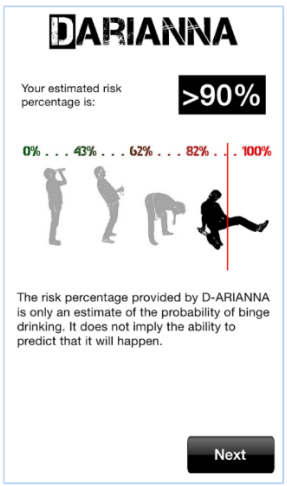

Figure 8. Screenshot of estimated risk percentage for binge drinking from the D-ARIANNA app.

Source: Google Play Store: http://archive.is/ZQi21.

New developments

Virtual reality (VR) has been explored as a new technology in assessment and cue exposure therapy for substance use disorders (Hone-Blanchet et al., 2014). Wearing a head-mounted display, users find themselves in a computer-generated three-dimensional (3D) environment that they can move around in and interact with. Through VR, social interactions and substance-related cues that are unique to users can be simulated in a representation of their natural environment (i.e. a bar), instead of presenting these cues detached from that environment. Hence, VR simulates a craving-inducing yet safe environment to practise new (refusal) skills. It must be noted that VR has not yet been extensively compared with other treatment conditions and that little is known about its long-term effects on craving (Hone-Blanchet et al., 2014).

Cognitive bias modification (CBM) has been considered a promising line of work in recent years, including in the field of substance use disorders. CBM interventions target cognitive processes directly, and in particular attentional biases and approach biases. These interventions often consist of repeating a set of cognitive tasks several times. A recent review concludes that there is little evidence for the effectiveness of (internet-based) CBM for SUDs, and that interventions need further development to achieve clinically relevant change in cognitive biases and substance use (Cristea et al., 2016). The inclusion in the Cristea et al. (2016) review of studies whose participants who were not motivated to change their behaviour may have attenuated the potential effects of CBM (Wiers, 2016), but clearly more research is needed to justify widespread clinical applications of CBM for substance use problems.

Effectiveness of e-health interventions

Most of the evidence on the effectiveness of e-health interventions for substance use problems has been collected for interventions that aim to reduce cannabis use (Tait et al., 2013; Hoch et al., 2016), alcohol use (Sundström et al., 2016) and smoking cessation (e.g. Civljak et al., 2013), and to a lesser extent to reduce stimulant and opioid use (Boumparis et al., 2017). In this section we summarise findings regarding effectiveness. If available, we also report evidence on factors that influence the effectiveness of these interventions (e.g. therapist involvement).

Cannabis

A number of studies have recently focused on the effectiveness of e-health interventions for cannabis use. We discuss two recent systematic reviews with meta-analyses. These two systematic reviews report small effects of e-health interventions on cannabis use, and provide little indication of factors that influence the effectiveness of the interventions.

Hoch et al. (2016) conducted a meta-analysis of four studies, involving a total of 9 128 participants, conducted outside clinical settings in Europe, the US, Australia and Oceania. The studies compared online motivational interviewing and CBT e-health interventions with a control condition, which was either a waiting list control condition or another therapist-delivered intervention. The meta-analysis revealed a small positive effect at three-month follow-up in favour of cannabis e-health interventions (effect size: Hedges' g = 0.11).

Tait et al. (2013) carried out a systematic review and meta-analysis of 10 randomised trials of e-health prevention and treatment interventions conducted in Germany, the US, Australia and Canada. The studies included a total of 4 125 participants and compared the effect over time of the

intervention or the control condition on the frequency of cannabis use. A small but significant post-treatment effect was found overall (Hedges' g = 0.16; 95 % confidence interval 0.09 to 0.22; $p < 0.001$) in favour of the cannabis e-health interventions. In a post hoc analysis the authors evaluated a number of factors that could potentially influence the effect sizes. However, in these subgroup analyses they did not find any significant moderating role for key factors such as type of control (active, waiting list), age group (11-16, 17+ years), gender, type of intervention (prevention or treatment), guided versus unguided programmes, mode of delivery (internet, computer), individual versus family dyad or intervention delivery setting (home, research setting). In addition, neither number of sessions nor time to follow-up was found to have any significant moderation effect.

A recent study by Schaub et al. (2015a) compared the effectiveness of online self-help interventions, with or without chat with a trained counsellor, and a waiting list control condition in reducing cannabis use. In this study, significant differences in cannabis use were found between the conditions self-help with chat counselling and waiting list, as well as between self-help with chat and self-help without chat, but no difference was found between self-help without chat and the waiting list condition. Clearly this indicates that guidance from a counsellor trained in e-health interventions for cannabis use can have a positive effect on cannabis use outcomes.

Stimulants and opioids

Boumparis et al. (2017) published a meta-analysis on the effectiveness of e-health interventions compared with control conditions in reducing the use of opioids, cocaine and amphetamines. The meta-analysis included 17 studies with a total of 2 836 adult participants. The results showed that e-health interventions led to a significant decrease in opioid drug use (four studies) and any illicit drug use (nine studies) after treatment. In the case of e-health interventions specifically aimed at reducing the use of stimulants, the decrease in use after treatment was small and non-significant. Overall, no association was found between duration of the intervention, or number of sessions, and effect sizes.

An ongoing European randomised control trial (RCT) will test the effectiveness of a web-based intervention to reduce cocaine use (Schaub et al., 2015b). This three-arm RCT will compare the effectiveness of a self-help web-based intervention, with and without chat counselling with a healthcare professional, and a waiting list control condition. The web-based intervention is based on CBT, behavioural self-management, motivational enhancement and social problem solving. The results will shed light on whether or not a therapeutic alliance between a therapist and cocaine users can be established through the internet, and whether or not this has an effect on treatment outcomes.

Alcohol

A recent review of 14 review studies on e-health interventions to reduce alcohol use provides an overview of knowledge and knowledge gaps in the field (Sundström et al., 2016). In this review, available evidence on effectiveness is integrated, and the impact of moderators of effectiveness such as the therapeutic orientation, length of intervention and guidance is explored. Across the included reviews, it was generally reported that e-health alcohol interventions were effective in reducing alcohol consumption, with mostly small effect sizes. It was also found that longer, multisession, interventions were more effective than shorter or single-session interventions. Evidence on the association between therapeutic orientation and alcohol use reduction, and between intervention

guidance and alcohol use reduction, was found to be limited, as the number of studies addressing these themes is low. All in all, for alcohol there is a relatively strong evidence base supporting the effectiveness of e-health interventions. Longer, more intensive interventions do lead to better outcomes than brief interventions.

Tobacco

A number of e-health interventions that aim to promote tobacco smoking cessation have been developed and tested in RCTs. CBT and associated intervention approaches such as acceptance and commitment therapy, together with techniques stemming from motivational interviewing, are the dominant therapeutic approaches (Blankers et al., 2016). Three meta-analyses (Myung et al., 2009; Shahab and McEwan., 2009; Rooke et al., 2010) and a Cochrane review (Civljak et al., 2013) report that guided and unguided e-health interventions for smoking cessation are probably more effective in helping people quit smoking than waiting list controls and information-only interventions. However, a substantial minority of the studies failed to find clinically relevant effects, and many of the other studies found only small positive effects. A recent meta-analysis on the effectiveness of (text-based) e-health interventions for smoking cessation versus smoking assessment or non-electronic self-help materials also reports relatively small but statistically significant positive effects of e-health interventions, with no indication of relevant effect moderators (Crocamo et al., 2017). However, if large numbers of smokers can be reached using e-health interventions, even a small effect can make a considerable public health impact. With regard to effect moderators, some authors have reported that only e-health interventions that were offered to tobacco smokers who are motivated to quit showed positive results (Shahab et al., 2009).

Conclusions and future directions

In this paper, we have presented definitions of e-health and m-health, and we have presented the various aspects that characterise e-health and m-health tools and interventions. Examples have been presented of the various forms in which e- and m-health interventions are currently used for prevention, treatment and harm reduction related to drug use. Regarding the effectiveness of the interventions, there is relatively strong evidence for the effects of e-health interventions aiming at the reduction of cannabis use, alcohol use and tobacco use, and some evidence for the reduction of opioid use. However, there is no compelling evidence to support the use of e-health for the reduction of stimulants use. There is a clear lack of research on the effectiveness of e-health applications for harm reduction purposes. This does not mean that the latter e-health applications are ineffective, however, or that they should not be used, but more research in these areas is needed. An opportunity for the coming years is to build a convincing evidence base for e-health and m-health tools that address understudied substances, as well as for harm reduction e-health interventions.

Another important challenge is to increase the use of existing evidence-based e-health/m-health tools and interventions — especially by hard-to-reach target populations, such as injecting drug users or drug-using immigrants. A first step may be to make sure that effective tools are kept available longer than is often currently the case. What frequently happens currently is that interventions are developed for (research) projects, and become unavailable after the project is finished, due to a lack of funding to cover the running costs of these interventions. As those yearly running costs are often only a fraction of the costs of the research and development project for which they were developed,

finding a solution to keep effective e-health tools available to the wider public after completion of those projects would be a very cost-effective approach to improving the value of e-health research and development projects.

The use of existing effective and successful e-health interventions could be further fostered by translating e-health tools developed in one language into other European languages. There is evidence which shows that the translation of effective e-health interventions is a cost-effective way to create new treatment possibilities (Lintvedt et al., 2013). Funding the translation of existing e-health tools from EU Member States to make them available in all other EU Member States could greatly advance the further implementation of e-health for substance use problems. Advances in technology have opened up significant possibilities for continuous, real-time data collection and feedback from a variety of sources (i.e. smartphones, social media, sensors, self-reporting). It has been suggested that a new approach to processing these data, involving the collection of relevant data, followed by the development of computational models, would reduce researchers' reliance on the need to test a particular theory (Spruijt-Metz et al., 2015).

A theme that has not been addressed thus far in this paper has to do with quality management and security of e-health tools. E-health tools used by people who consume illegal substances may contain very sensitive data, which may pose a risk to the end user if handled in an indiscreet manner. EU-level regulations and good practices regarding data security for e-health interventions targeting substance users should be strictly implemented, and this implementation should be monitored.

All in all, e-health and m-health tools form a relevant and promising innovation in addressing substance use problems in Europe.

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