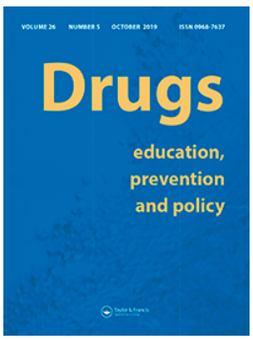
Knowledge and utilization of technology-based interventions for substance use disorders



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Gianluca Quaglio[a,b,c], Alessandro Pirona[d], Giovanni Esposito[e], Theodoros Karapiperis[a], Helmut Brand[c], Geert Dom[f], Luigi Bertinato[g], Linda Montanari[d], Falk Kiefer[h] and Giuseppe Carrà[i]

[a]Scientific Foresight Unit (Science and Technology Options Assessment [STOA]), Directorate-General for Parliamentary Research Services (EPRS), European Parliament, Brussels, Belgium; [b]Department of Medicine, Addiction Medicine Unit, Verona University Hospital, Italy; [c]Department of International Health/CAPHRI, Maastricht University, The Netherlands; [d]European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), Lisbon, Portugal; [e]European Brain Council, Brussels, Belgium; [f]Antwerp University (UA) and Hospital (UZA), Antwerp, Belgium; [g]Istituto Superiore di Sanità, Rome, Italy; [h]Department of Addictive Behavior and Addiction Medicine, Central Institute for Mental Health, University of Heidelberg, Medical Faculty, Mannheim, Germany; [i]Department of Medicine and Surgery, University Milano Bicocca, Italy

ABSTRACT

Background: Little is known about the knowledge and use of technology-based interventions (TBIs) by health personnel working in the addiction field across Europe.

Methods: An online questionnaire was designed using SurveyMonkey® in order to determine the level of knowledge, use and perceived efficacy of TBIs in substance use disorders (SUDs), among health professionals across six EU Member States: Germany, Italy, UK, France, Poland and the Netherlands. The survey was sent to a convenience sample of 1200 addiction experts.

Results: Surveyed participants (311, response rate 26%), had a mean professional addiction experience of 17 years; 23% stated to have good knowledge of TBIs, while 12% use them in their clinical practice. Forty-six percent consider TBIs useful in the treatment of addiction, and 44% foresee a significant increase of them in the future. TBIs were considered important for people facing barriers to accessing treatment (63%) and for providing support outside the formal care settings (60%). Lack of technical support (48%), poor infrastructure and equipment (42%), and lack of digital literacy among health workers (38%) were identified as the main obstacles in the diffusion of TBIs.

Conclusions: Knowledge and utilisation of TBIs among health workers in drug addiction field is low. Nevertheless, TBIs are perceived as a possible means of facilitation in providing access to treatment, and as therapeutic tools which will become more important in the future. The need to improve training policies, awareness and attitudes towards TBIs among EU health professionals, working in the field of addiction is paramount.

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Technology-based interventions; addiction; internet; drug policy; European Union

Introduction

Over the last two decades, the European Union (EU) has witnessed an extraordinary growth in the range of computer and mobile technologies, with the majority of households (81%) having internet access (Eurostat Statistics Explained, 2017a). There are, however, discrepancies among EU Member States (MSs). For example, 9 out of every 10 individuals in Denmark, Luxembourg, the Netherlands, Sweden, Finland and the UK, use the internet. In comparison, less than two-thirds of citizens use the internet in Portugal, Greece, Italy, Bulgaria and Romania. On average, 57% of the EU population has access to mobile internet. Comparisons can also be made between the widespread availability in Norway (83%) and the UK (79%), compared with the limited access in Bulgaria (38%) and Italy (26%) (Eurostat Statistics Explained, 2017b). Moreover, in recent years, the use of new technologies in prevention, information and support health programmes is rapidly gaining acceptance among European citizens [European Commission (EC), 2012a]. In a survey carried out in the EU, 60% of respondents used the internet for health-related information in the last 12 months (EC, 2014). The rapidly escalating cost of healthcare contributes to creating a strong need for innovative interventions to promote healthcare delivery. European public health systems have difficulties addressing these needs for a range of reasons, particularly lack of resources (Quaglio, Karapiperis, Van Woensel, Arnold, & McDaid, 2013) and shortage of health personnel [European Parliament (EP), 2015]. Given these trends, it is not surprising that there has been significant interest in Europe devoted to the development and implementation of interventions and digital solutions delivered within European healthcare systems through computer and mobile technologies. In this context, increasing interest in this area is also observed in the provision of e-health interventions to people with substance

CONTACT Gianluca Quaglio gianluca.quaglio@europarl.europa.eu Scientific Foresight Unit (Science and Technology Options Assessment [STOA]) Directorate-General for Parliamentary Research Services (EPRS) European Parliament Rue Wiertz, 60, B-1047 Brussels, Belgium

Supplemental data for this article can be accessed here.

use disorders (SUDs) [Crocamo et al., 2017; European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), 2009; Marsch, Carroll, & Kiluk, 2014; Wood et al., 2014]. Technology-based interventions (TBIs) include technology-assisted behaviour therapies, education, prevention and information interventions, recovery support programmes and wellness monitoring (Quaglio & Esposito, 2017). These applications can be used through different technologies, including telephone (audio)counselling and web-based video conferencing tools, self-directed desktop therapeutic tools, web-based text communication (email, chat, forums), as well as mobile technologies. Significant overlap exists between the use of the aforementioned categories [Substance Abuse and Mental Health Services Administration (SAMHSA), 2015].

The significant variation in participant inclusion criteria and quality of methodology of many existing published studies makes it difficult to draw conclusions on the efficacy of TBIs for SUDs. Most evidence tends to be substance-specific (Hoch, Preuss, Ferri, & Simon, 2016), and related to tobacco (Civljak, Stead, Hartmann-Boyce, Sheikh, & Car, 2013; Gulliver et al., 2015) or alcohol treatment (Champion, Newton, Barrett, & Teesson, 2013; Sundström, Blankers & Khadjesari, 2017). Although some evidence involving illicit drugs is already available (Christensen et al., 2014; Eibl et al., 2017; Tait, Spijkerman, & Riper, 2013), much more work is needed (Danielsson, Eriksson & Allebeck, 2014). In addition, a lack of clarity remains about what types of TBIs are most effective (SAMHSA, 2015). Despite these limitations, there is growing evidence on the efficacy of the use of TBIs for SUDs. The magnitude of success in behavioural change tends to be small to medium according to many meta-analytic studies (Carrà et al., 2016; Danielsson et al., 2014; Gulliver et al., 2015; Sundström et al., 2017; Tait, Spijkerman, & Riper, 2013; Wood et al., 2014). Nonetheless, these changes need to be favourably considered, because from a public health perspective, even small changes are meaningful at the population level, allowing for the expansion of the therapeutic toolkit (Barak, Klein & Proudfoot, 2009; Portnoy, Scott-Sheldon, Johnson, & Carey, 2008).

Benefits and challenges with TBIs for SUDs

A great number of people with SUDs do not seek treatment and there are high attrition rates among those that do. This means that existing treatment options are not suitable or sufficiently interesting to them. TBIs represent an opportunity for an increased access to treatment (SAMHSA, 2015; VanDeMark et al., 2010). TBIs can reach certain populations not reached by traditional treatment facilities (Lieberman & Huang, 2008; Litvin, Abrantes, & Brown, 2013). They can be particularly useful in reaching people living in remote settings (Young, 2012), or those with physical limitations (Portnoy et al., 2008). TBIs can be particularly useful for people for whom privacy is an issue (Wood et al., 2014). TBIs can be easily accessed by patients on a regular basis and can provide more frequent and/or longer therapeutic contact. The use of telemedicine has started to be implemented in prison in some countries as a way to ensure the continuity of care. TBIs can be used in association with other care tools, giving clinicians the opportunity to extend the therapeutic offer. In addition, clinicians may replace a portion of their typical interaction with users with a TBI, which may allow for the treatment of more clients with the same number of clinicians (Marsch & Dallery, 2012; SAMHSA, 2015). TBIs can provide automated information with a high degree of standardisation, which is not always possible in face-to-face interventions. This standardisation could permit a detailed examination of different aspects from a clinical and research perspective (Litvin, Abrantes, & Brown, 2013). In addition, TBIs may allow for data about an individual's substance use and triggers to be obtained from people in real-time (e.g. via mobile devices) (Marsch & Gustafson, 2013). They also have been shown to have the potential to involve users previously excluded from research (Danaher, Hart, McKay, & Severson, 2007). TBIs are assumed to be cost-effective treatments (Portnoy et al., 2008; Litvin, Abrantes, & Brown, 2013). Although the initial implementation of TBI programmes can be costly, the cost of hosting and maintaining access to them thereafter is generally limited (Marsch & Dallery, 2012).

Alongside these positive aspects, a number of challenges need to be acknowledged. Some argue that the TBIs are not suitable for clinical work because they do not guarantee an adequate level of privacy (Quaglio & Esposito, 2017). TBIs may not be appropriate for all patients as some may prefer and respond better to a face-to-face interaction (Marsch & Dallery, 2012; SAMHSA, 2015). The great majority of internet-based communication for therapeutic purposes is conducted in textual, not verbal, relationships. For a number of individuals, this could represent a limitation. Participants with a substantial chronic drug use and heavy psychiatric problems may not benefit from TBIs (Quaglio & Esposito, 2017). The use of the internet as a medium for delivering interventions may bias against people with low computer literacy (McClure, Acquavita, Harding, & Stitzer, 2013). The use of the internet for the purchase of drugs has recently gained concerns (Nielsen & Barratt, 2009). In addition, drug users now have more access to both licit and illicit drugs through websites, as well as contact with suppliers through mobile and social networks (Mounteney, Oteo & Griffiths, 2016). Other disadvantages of TBIs include the fact that they are not suitable for emergency situations, when an immediate intervention of the therapist is necessary, and the impracticality of analysing biochemical outcomes (i.e. drug tests) (Shahab & McEwen, 2009).

SUDs in Europe: some figures

Around 23 million people are affected by alcohol-related disorders in Europe (Rehm, Manthey, Struzzo, Gual, & Wojnar, 2015; Shield, Rylett, & Gmel, 2013). One in four EU citizens over 15 years old is a tobacco smoker (EC, 2017; Eurostat Statistics Explained, 2017c). An estimated 17.1 million young Europeans (aged 15–34 years) used cannabis in the last year (EMCDDA, 2017). There are about 1.3 million high-risk opioid users in Europe and 2.3 million young adults (aged 15–34 years) used cocaine in the last year (EMCDDA, 2017). However, addiction prevalence (and treatment provision and policies) are not consistent between EU MSs. Figures and a

Table 1. Prevalence, treatment and national drug strategy of the six EU MSs included in the study.

Country and population[a]	Drug use[b]	Treatment[c]	Policy/national drug strategy
France 41,896,237	Cannabis 22.1% Cocaine 2.4 MDMA 2.3% Amphetamines 0.7%	Cannabis 60% Heroin 20% Cocaine 6% Others 14%	The national plan against addictive behaviour addresses the use of illicit and licit substances, and non-substance-related addictive behaviours. It has five areas of action: (i) promoting prevention, care and risk reduction; (ii) stepping up the fight against trafficking; (iii) improving the application of the law; (iv) creating policies for combating drugs and addictive behaviours on research and evaluation studies; and (v) reinforcing coordination at the national and international levels.
Germany 53,422,103	Cannabis 13.3% Amphetamines 1.9% MDMA 1.3% Cocaine 1.2%	Cannabis 39% Heroin 33% Amphetamines 17% Others 11%	In Germany the ongoing national drug and addiction policy strategy is comprehensive on four pillars: (i) prevention; (ii) counselling and treatment; (iii) harm reduction measures; and (iv) supply reduction. It covers six areas: alcohol; tobacco; prescription drug addiction and prescription drug abuse; gambling; online/media addiction; and illegal drugs. Germany, like other European countries, evaluates the impact of drug policies through routine indicator monitoring and specific research projects.
Italy 39,193,416	Cannabis 19% Cocaine 1.8% MDMA 1% Amphetamines 0.6%	Cannabis 20% Heroin 52% Cocaine 25% Others 3%	In Italy, the ongoing national action plan on drugs, are set out in two pillars: demand and supply reduction. The first include activities on prevention, treatment, rehabilitation and reintegration; the second covers evaluation and monitoring, legislation, supply reduction and juvenile justice. Primarily focussed on illicit drug use, the plan also covers licit substance use and addictive behaviours as elements that are addressed predominantly in the context of prevention.
Poland 26,431,118	Cannabis 9.8% MDMA 0.9% Cocaine 0.4% Amphetamines 0.4%	Cannabis 28% Amphetamines 24% Heroin 12% Others 36%	The Poland's national programme drug addiction has five pillars: (i) prevention; (ii) treatment, rehabilitation, harm reduction and social reintegration; (iii) supply reduction; (iv) international cooperation; and (v) research and monitoring. It is also supported by three other strategies: focussing on preventing alcohol-related problems, on combatting health consequences of using tobacco and the behavioural addictions strategy. As in other EU MSs, Poland evaluates its drug policy and strategy through ongoing indicator monitoring.
The Netherlands 11,065,975	Cannabis 16.1% MDMA 6.6% Cocaine 3.6% Amphetamines 3.1%	Cannabis 47% Cocaine 24% Heroin 9% Others 20%	The 'Drug policy: continuity and change' set out the principles of the Dutch illicit drugs policy. Taking a balanced approach, it continued the distinction between 'soft' and 'hard' drugs. It outlined four major objectives: (i) to prevent drug use and to treat drug users; (ii) to reduce harm to users; (iii) to diminish public nuisance caused by drug users; and (iv) to combat the trafficking of drugs. A recent policy document ('Letter outlining the new Dutch policy') placed an increased emphasis on prevention and use reduction.
UK 41,898,460	Cannabis 11.3% Cocaine 4% MDMA 3.1% Amphetamines 0.9%	Cannabis 26% Heroin 42% Cocaine 14% Others 18 %	The ongoing UK's drug strategy addressing illicit drugs and has two overarching aims: (i) to reduce illicit and other harmful drug use; and (ii) to increase the number of people recovering from their dependence. These aims are addressed though three thematic areas: (i) reducing demand; (ii) restricting supply; and (iii) building recovery in communities. The UK's drug strategy is subject to annual implementation progress reviews.

EMCDDA. Country Drug Report 2017.
[a]15–64 years; [b]In young adults (15–34 years) in the last year; [c]Treatment entrants by primary drug.

brief description of the policy issues in the EU MSs involved in this study are provided in Table 1.

Aims of the study

Despite growing evidence of the efficacy of TBIs for treating SUDs, there has been no comprehensive estimate of access and use of TBIs among EU health personnel involved in SUDs treatment. In addition, barriers to using such technologies among health workers are not well-understood. A lack of confidence in e-health or a low level of digital literacy among healthcare professionals may impose a barrier on delivery of TBIs (Ramsey, Lord, Torrey, Marsch, & Lardiere, 2016). Therefore, we conducted a study across six EU MSs, with the purpose of identify the extent to which these technologies are used, their perceived clinical efficacy, factors hampering their implementation and possible strategies to promote their use in the future. A better knowledge of the use of TBI's for drug addiction, might increase their use and the confidence of professionals in them, but can also help decision-makers to better understand their potential from a public health perspective. TBIs allow behavioural health professionals and clients to interact synchronously or asynchronously. This study includes TBIs that fall in both general categories and may be integrated into prevention and treatment programmes.

Table 2. Professional organisations involved in the dissemination of the survey among their members.

Name of organisations
European Federation of Addiction Societies (EUFAS)
European Psychiatric Association (EPA), Section of Addictive Behaviours
European Federation of Psychiatric Trainee (EFPT)
European Academy of Neurology (EAN), Section of Neurotoxicology
Polish Society for Addiction Research
French Alcohology Society
Dutch Psychiatric Association (NVvP)
Tactus, the Netherlands
Society for Addiction Medicine Netherlands (Vvgn)
Italian Association of Addiction Societies (FeDerSerD)
Italian Alcohology Society (SIA)
Italian Psychiatric Society (SIP)
German Society for Addiction Research and Treatment (DG-Sucht)
German Society of Addiction Medicine (DGS)
German Society of Addiction Psychology (DGSPS)
Society for the Study of Addiction, UK
Specialist Clinical Addiction Network, UK
Royal College of Psychiatrists, UK
Faculty of Addictions, UK

Methods

Sampling strategy

A 21 question online survey was designed with the aim of collecting feedback from experts in the field of drug addiction in France, Germany, Italy, the Netherlands, Poland and the UK. The experts were intentionally selected from professional and scientific organisations within the network of the European Brain Council (EBC) (EBC, 2017). The EBC is a non-profit organisation gathering patient associations, major brain-related scientific and clinical societies as well as industries. In particular, the European Psychiatric Association (EPA) and the European Federation of Addiction Societies (EUFAS) played a major role in the recruitment process which specifically targeted recognised experts with substantial experience in SUD treatment. In this study, participants were recruited using a convenience and respondent-driven sampling approach. This method was considered appropriate as it was an exploratory study. More specifically, the following steps were taken: (i) circulation of the survey among members of relevant professional organisations in the area of addiction from the network of the EBC (Table 2); (ii) contacts collected from lists and online databases of public health centres for SUDs treatment; and (iii) contacts provided directly by respondents. Responses were consecutively collected until a homogenous geographical coverage of about 50 respondents per country was reached.

Questionnaires and procedures

A pilot questionnaire was developed and sent to 10 experts in SUDs. The English master version of the survey was then translated into four European languages: Italian, French, Polish and German. A survey in each language was made available on the SurveyMonkey online platform (SurveyMonkey, 2016) and sent by email. The email contained a link to the SurveyMonkey questionnaire which respondents completed anonymously. Several reminders were sent in order to maximise the number of responses. No compensation was provided for completion of the survey.

In this survey 'TBIs' explicitly referred to a set of TBIs for health behaviour change that are grouped under the following classifications (Barak, Klein & Proudfoot, 2009): (i) Online self-help interventions: primarily refers to self-guided intervention programmes that are executed by means of a prescriptive online programme through a website used by patients; (ii) Internet/technology/digitally mediated therapy (online counselling and therapy): refers to synchronous (i.e. real time) or asynchronous (i.e. not in real time, such as email) mode of communication (text, audio or video-based) between a therapist and a client via the internet; (iii) Therapeutic use of social media: e.g. blogs, support groups, generated and maintained by patients rather than clinicians (but including services that are moderated by a health worker); and (iv) Artificial intelligence and virtual reality therapeutic software (e.g. robot simulation of therapists).

The survey included measures of the following domains: (A) Demographics (questions 1–9). Respondents provided information about their gender, age, country, affiliation, job title, specialisation (for MDs), years of experience in SUDs, and main competences in the field of SUDs; (B) Knowledge and use of TBIs (questions 10–14). Experts provided information on their level of knowledge of TBIs; the frequency of use of TBIs; the willingness to attend training courses on TBIs; the integration of TBIs in their setting for SUD treatment; the degree of use of TBIs for SUDs in their country; (C) Perceived efficacy of TBIs in the treatment of SUDs (questions 15–18). Information was acquired from the experts on the efficacy of TBIs in SUDs treatment as a whole; efficacy of TBIs for improving different aspects of SUD treatment; efficacy of different TBI tools; efficacy of TBIs with different populations of users; (D) Factors hindering the use of TBIs and future policy (questions 19–21). The opinion of the experts was collected on trends in TBI for SUDs foreseen in the future-perceived factors that hinder TBI implementation, and effective actions in promoting TBI for SUDs. To collect the information in domain B, C, and D, a Likert scale was used (see Table 4 and questionnaire in the Annex).

Data analyses

Respondents' demographic and practice characteristics, knowledge, and opinions were descriptively reported using frequencies and percentages for categorical variables. In order to explore the relationship between survey responses and select demographic characteristics further (e.g. country and affiliation), a basic descriptive analysis was carried out.

Results

Respondents' characteristics

An invitation to participate in the survey was sent to 1200 experts and 351 complete questionnaires were received (26%). Respondents' characteristics are described in Table 3. The mean (SD) age of the sample was 48.7 years (11.93) 59% were males. The sample was characterised by the prominent presence of experts working in public organisations (67%). The majority of the sample was made up of medical doctors (67%) most of whom were psychiatrists. The mean (SD)

Table 3. Demographic characteristics of respondents.

Variable	*N*	%
Gender		
Male	184	59
Female	127	41
Age		
18–34	38	12
35–44	68	22
45–54	89	29
55–64	99	32
65+	17	5
Country[a]		
Poland	65	20
Germany	55	17
Italy	51	16
France	50	16
UK	50	16
The Netherlands	47	15
Affiliation		
Public organisation	208	67
Academia/Research centre	40	13
Private non-profit organisation	29	9
Public authority	17	5
Private for profit organisation	11	4
Other	6	2
Job title		
Medical doctor	210	67
Psychologist	64	21
Researcher	13	4
Health administrator/manager	5	2
Nurse	4	1
Other	15	5
Specialization (for MD)		
Psychiatry	112	53
Addiction medicine	76	36
Internal medicine	4	2
Neurology	4	2
Other	14	7
Years of experience in SUDs		
0–10	116	37
11–20	80	26
20+	115	37
Area of major competence[a]		
Alcohol	242	78
Opioids	138	44
Stimulants (cocaine, etc.)	40	13
Novel psychoactive substances	36	12
Tobacco	34	11
Gambling	26	8
Others	29	9

[a]Up to two answers were allowed.

duration of working experience in the field of SUDs was 16.9 years (10.81). Thirty-seven percent reported more than 20 years of clinical experience working with SUDs.

Knowledge and use of TBIs for SUDs

As a whole, 23% of participants claimed a good or very good level of knowledge on TBIs, whereas 48% reported that their level of knowledge was poor or very poor. The lowest level of knowledge was reported among people working in the public sector (56% stated to have a poor or very poor level of knowledge on TBIs) compared with those in the private sector and academia (30 and 20%, respectively). Likewise, 12% of respondents reported that they often or most often used TBIs in their clinical practice, while 64% rarely or never used these tools. When analysing the level of utilisation by affiliation, the lowest level was found among people working in the public sector (70% stated that they rarely or never used TBIs) compared with those in the private sector and academia (45 and 50%, respectively). The majority (66%) of participants were willing to attend training courses on the use of these technologies in the treatment of SUDs, with a minority (18%) not ready to do so. Sixty-nine percent of respondents reported that TBIs are poorly or very poorly integrated in the healthcare setting where they work. Again, this percentage was higher for the public sector (75%) in comparison with the private sector (43%). A large majority of experts (73%) reported that the use of TBIs for SUD treatment was poorly widespread also in the country in which they work. This is consistent across all EU countries, with the only exception being the Netherlands where only 34% reported that utilisation of TBIs was low.

Perceived efficacy of TBIs

Perceived efficacy of the use of TBIs is shown in Table 4. Despite the low knowledge and utilisation levels, about 46% of respondents consider TBIs to be effective or very effective in the treatment of SUDs. This percentage increased to 58% in the TBI-competent subgroup (defined as participants who have fair/good/very good level of knowledge of TBIs). Survey participants considered TBIs important or very important to aid populations with significant barriers in accessing treatment (63%) and to allow for on-demand access to therapeutic support outside of formal care settings (60%). In general, online counselling and therapy (43%) are perceived as the most effective TBIs by the respondents. TBIs are perceived to be particularly effective in the treatment of tobacco users (44%), alcohol users (40%) and gamblers (37%), though less effective in the treatment of opioid users (20%).

Factors hindering the use of TBIs and future policies

Possible factors hindering the use of TBIs and effective actions towards the promotion of new technologies for SUDs are shown in Table 4. Forty-five percent of the survey's participants foresee a significant or high increase in the use of TBIs for SUDs, while 15 and 30% of respondents expect low and modest increase, respectively. Concerning the underlying obstacles facing the diffusion of TBIs for SUDs, the survey's participants identified lack of technical support (47%), poor infrastructure and equipment (43%), and the lack of digital literacy among health workers (38%). The need for increased awareness among health workers (66%), more dedicated funding (64%), improved sustainability of TBI initiatives (61%) and increased awareness among drug users (60%) are all factors that can contribute to fostering TBI dissemination among health professionals.

Discussion

The data collected provide insights into the diffusion, perceived clinical efficacy and barriers to the utilisation of TBIs for SUDs among health professionals in six EU MSs. The complexity of the topic, and the diverse development and

Table 4. Perceived effectiveness, hindering factors and future policies in promoting TBIs for SUDs.

Perceived efficacy of TBIs in the treatment of SUDs (%)						
Efficacy of TBIs in SUDs as a whole	Not effective	Slightly effective	Moderately effective	Effective	Very effective	No opinion
Whole sample (311)	0	10	24	34	12	20
ICT competent subgroup (162)	0	10	28	41	17	4
Efficacy of TBIs in different aspects of SUDs	Not effective	Slightly effective	Moderately effective	Effective	Very effective	No opinion
To reduce barriers in accessing treatment	8	0	21	31	32	8
To allow for on-demand treatment	8	0	22	34	26	10
To treat more individuals simultaneously	12	0	22	31	23	12
To obtain individual real time information	15	0	21	32	19	12
To treat more subjects with the same n. of clinicians	18	0	28	25	14	14
To be more cost effective	26	0	23	25	10	16
Efficacy of different TBIs in SUDs	Not effective	Slightly effective	Moderately effective	Effective	Very effective	No opinion
Online counselling and therapy	0	12	27	33	10	18
Social media	0	14	30	31	9	16
Online self-help interventions	0	17	29	29	6	20
Artificial intelligence and virtual reality	0	23	15	15	6	41
Efficacy of TBIs in SUDs for	Not effective	Slightly effective	Moderately effective	Effective	Very effective	No opinion
Tobacco users	0	12	25	32	12	19
Alcohol users	0	17	27	31	9	16
Gamblers	0	12	29	29	9	21
Novel psychoactive substances users	0	17	25	25	6	27
Stimulants users	0	24	25	22	5	24
Opioids users	0	30	26	15	5	24
Factors hindering the use of TBIs and future policy in promoting TBIs for SUDs (%)						
Factors hindering the use of TBIs in the treatment of SUDs	Not at all	Slightly	Moderately	Very	Extremely	No opinion
Lack of technical support	5	15	23	29	18	10
Poor infrastructure/equipment	10	15	24	23	20	8
Lack of digital literacy of health workers	9	15	29	27	11	9
Lack of interest of substance users	7	21	29	20	8	15
Cultural bias towards the use of ICTs	12	19	26	20	8	15
Lack of digital literacy of substance users	9	22	34	17	7	11
Trend foreseen in the future	No increase	Low increase	Modest increase	Significant increase	High increase	No opinion
Whole sample (311)	3	12	30	35	10	10
Effectiveness of the different policy in promoting TBIs	Not effective	Slightly effective	Moderately effective	Effective	Very effective	No opinion
Increase awareness among health operators	0	7	18	39	27	9
Increase funding for project promoting ICTs	0	7	17	31	33	12
Improve coordination of TBIs initiatives	0	9	18	38	23	12
Increase awareness among substance users	0	10	21	37	23	9
Strengthen sustainability of successful initiatives	0	7	20	32	27	14
Perform studies analysing hindering factors	0	10	24	30	26	10
Generate European regulatory frameworks	0	15	22	26	24	13

organisation of health systems in Europe make it hard to generalise these findings to the wider EU. However, several key findings emerged that will help guide further research, practice and policy.

Level of utilisation, knowledge, and TBIs as tools for treatment

Healthcare professionals have traditionally lagged behind with regards to the utilisation of ICT in their daily activity (Murray et al., 2011; Yarbrough & Smith, 2007). Several explanations have been put forward in order to understand why (Gagnon et al., 2012; Kaushal, Shojania, & Bates, 2003; McGinn et al., 2011). This is confirmed also by the present study, where 64% of respondents stated to have rarely/never used these tools in their clinical practice. A similar proportion reported that TBIs are not at all/poorly integrated in their healthcare setting. It is apparent from the findings that this was generally applicable to the countries in which they worked. A number of surveys have been conducted on the physician–patient relationship and ICT applications, but primarily from the patient's perspective (Iverson, Howard, & Penney, 2008; McGeady, Kujala, & Ilvonen, 2008; Seçkin, 2010; C.C. Tsai, S H. Tsai, Zeng-Treitler, & Liang, 2007). A recent survey from the physician's perspective, measured the levels of availability of ICT [which reflects the organisational context in which general practitioners (GPs) work] and use of e-health applications and services among 9196 European GPs (Codagnone & Lupiañez-Villanueva, 2013). The results showed that only 40% have the technical availability to interact with patients by email about health-related issues (Health Information Exchange), and among them, only 36% used this function regularly. GPs were also asked about availability and use of different tele-health services. Consultation with patients was reported as available by 10% of GPs and monitoring patients remotely at their homes by only 4% (Codagnone & Lupiañez-Villanueva, 2013). Another survey collected data on the mean number of patient contacts that European GPs have on a normal working day, either via face-to-face contact or by phone or email. A total of 34% of GPs reported close to one email communication per day. The number of daily emails was very low ($n = 1$) compared with face-to-face interaction ($n = 31.5$) and telephonic contact ($n = 8.7$) (De Rosis & Seghieri, 2015). Interestingly, similar low percentages were reported from other surveys involving mental health professionals. For instance, a study carried out

among psychotherapists in the UK, found that only 2.4% were using computerised self-help with their clients and only 1% were using computerised self-help as an alternative to face-to-face contact (Whitfield & Williams, 2004).

The present study also shows that the level of knowledge around TBIs is relatively low: only half of the respondents reported an adequate level of knowledge of TBIs. Similar results were found in a more recent study carried out among a group of decision-makers on the use of TBIs for behavioural healthcare (Ramsey et al., 2016).

Notwithstanding the low level of knowledge and use, the majority of the respondents believe that TBIs could be relevant when improving access to treatments (60% of respondents). In this respect, TBIs have the potential of filling, at least partially, the current provision gaps in terms of availability of treatment for SUDs. Studies have shown that 10% or less of the people fulfilling the diagnostic criteria for alcohol use disorders receive treatment in Europe (Rehm et al., 2015), and only a small proportion of EU smokers receive adequate care and treatment. Existing European cannabis treatment programmes reach only a very limited proportion of problematic cannabis users (EMCDDA, 2015; Hoch et al., 2016). This is partially due to the fact that users believe that treatment is not necessary, and at times, unaware of the different treatment options. Another important barrier is stigma, which has been shown to reduce the probability of approaching healthcare services (Gates, Copeland, Swift, & Martin, 2011; Wallhed Finn, Bakshi, & Andréasson, 2014). TBIs appear to be recognised as useful instruments in order to reduce these gaps.

TBIs for SUDs may not be appropriate for all clients. For example, participants with significant SUDs associated with high levels of psychiatric comorbidities (e.g. current heroin injectors) may not benefit from TBIs (EMCDDA, 2009). Respondents in this study shared these concerns, as they believed that TBIs were particularly effective in the treatment of tobacco and alcohol, but not for opioid users. Most TBIs are for licit drugs, but it is also important to gain data about TBIs for illicit drugs, which at the moment remains scarce (Christensen et al., 2014).

Factors hampering the use of TBIs and future policies

Several studies have described the existing barriers to e-health in Europe. They focus on the interoperability of e-health services (semantic, legal and organisational) and e-health deployment and uptake (funding, awareness, evidence, digital health literacy etc.) (EC, 2012a; Moen et al., 2013; Quaglio et al., 2016, 2017). Some of these barriers emerged also as factors hindering the use of TBIs in the SUD field: lack of technical support, poor infrastructure equipment and lack of digital literacy of health workers. It has been observed that a clinician skilled in treating subjects with SUDs and with good knowledge of online technologies will not necessarily make an expert online therapist (Lovejoy, Demireva, Grayson, & McNamara, 2009). Although training courses on TBIs for SUDs have started to appear in the EU, they remain few in number (European Health Parliament, 2016). In addition, few standards exist that explain the technical skills required to practice online therapy with these clients. Finally, it is worth mentioning that a minority of respondents reported cultural bias towards TBIs as a major barrier to the implementation of these technologies. A cultural bias lies in the belief of some professionals who consider that TBIs lack the essential element of direct human-to-human communication (McLean, 2011).

Optimism regarding the promise of TBIs should not be mitigated by the lack of knowledge and limited access to new technologies by health professionals revealed in this study. On the contrary, the results should support decision-makers in addressing the concerns raised. These findings suggest a strong need for broad dissemination of information about available TBIs and the need to improve education, training and technical assistance (Ramsey et al., 2016). Increased awareness about the benefits of TBIs and the fostering of digital literacy among healthcare professionals and patients are widely recognised as important. Significant EU resources would be needed for e-health implementation; however, this could have little effect because the ability of health professionals to adopt new technologies is lacking (European Health Parliament, 2016). The digital literacy that health workers need, extend beyond understanding how TBIs work, and include the ability to instruct patients on their use (McClure et al., 2013; VanDeMark et al., 2010). Dissemination efforts should aim to eradicate concerns among health professionals, such as the fear that TBIs could replace them or that patient care could be compromised (Ramsey et al., 2016). The introduction of TBIs should be framed in a way to that allows providers to improve the quality of their work, through focus on the most crucial issues, in order to reach more patients.

With increasing access and demand for TBIs, health workers will need to embrace this evolution and evolve along with it (EMCDDA, 2014). Nearly half of our respondents (44%) foresee a significant/high increase in the use of TBIs in the future. The vast majority of participants feel insufficiently trained to deal with the digital revolution and the idea of establishing tailored training programmes was strongly supported. Training for health personnel is becoming not only necessary but also multidisciplinary, developing collaborations with professionals of other fields, such as cognitive psychology, statistics and communication experts (Marsch & Gustafson, 2013; Ramsey et al., 2016).

A suggested option was to provide more funding for initiatives and projects promoting TBIs. However, austerity has led Europe to reduce spending in those categories that encompass most drug-related initiatives (health, social protection and public safety). Nonetheless, policy-makers are aware of the need for more cost-effective policy measures and, in some EU countries, the restructuring of drug services has been attempted (EMCDDA, 2014). As a whole, the European Commission encourages methods to reduce healthcare costs that include TBI approaches to foster efficiencies in care delivery (EC, 2012b).

Limitations and conclusions

To the best of our knowledge, this was the first survey of a large network of European health professionals in the

addiction field, on the impact of TBI on SUDs care. The study has some limitations (common to online surveys), which need to be addressed: (i) the study attrition was high, with only 26% of the initial sample selected having responded; (ii) there was a bias of predefined and closed questions, which may have brought about bias due assumptions made by those running the study around anticipated issues; (iii) although the questionnaire contained a question on the efficacy of different type of TBIs, the survey did not explore TBI variation in detail, as the main objective of this paper was to provide a general overview of TBI use for drug addiction in Europe, which will hopefully help decision-makers to better understand these tools from in a public health perspective; (iv) the greater majority of respondents were represented by medical doctors and this could reduce the generalizability of the results. However, it should be noted that medical doctors are one of the major health professionals providing care for those seeking treatment for SUDs in EU public health centres. In Italy, for example, there were 7186 workers in public health centres treating SUDs in 2016. Of them, 23% were medical doctors, 28% were nurses, 15% were psychologists, 14% were social assistants, and 20% fell into other categories (Italian Government, 2017); and (v) the survey targeted health professionals working in public centres for SUDs treatment, not including special professionals group such as those involved in online counselling who are likely to be more used with TBIs.

That said, all questions in the survey were reviewed by a panel of researchers during the pilot study, and, thus, the questionnaire was less likely to include items that could mislead respondents' judgment. In addition, the majority of participants were health professionals with many years of experience in the field of SUDs, confirming that most of the collected opinions were underpinned by a significant professional background. TBIs represent an exciting and promising development in the treatment of SUDs, but technological and non-technological factors should be addressed effectively in order for these technologies to become more widely adopted. This comprehensive data set on the use of TBIs among European health professionals working in the SUD field provides preliminary insight, which can be used as a starting point able to assess the development of TBIs in the prevention and treatment of SUDs in the future.

Disclosure statement

No potential conflict of interest was reported by the authors.

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