

Clinicians' use of and attitudes towards technology to provide and support interventions in child and adolescent mental health services

Bethany Cliffe¹, Abigail Croker², Megan Denne² & Paul Stallard^{1,2}

¹Department for Health, University of Bath, Bath, UK

²Child and Family Service, Temple House Practice, Keynsham, UK

Background: Technology can increase child and adolescent mental health service (CAMHS) capacity by supporting and delivering interventions, yet it has not been widely adopted by CAMHS child mental health professionals. Uptake can either be facilitated or obstructed by child mental health professionals' attitudes, which remain largely unknown. **Method:** One hundred fifty-four CAMHS child mental health professionals completed a questionnaire about their use of, and attitudes towards, using technology with children and adolescents. **Results:** Child mental health professionals perceived themselves as generally competent at using technology, especially younger child mental health professionals, and perceived it to be helpful in their clinical work. A number of benefits of its use were identified such as accessibility, convenience and appeal, and it was primarily perceived as a preventative/psychoeducational tool rather than a replacement for face-to-face therapy. Older technologies (helplines and websites) were most frequently used, whereas newer technologies (computer games) were rarely used. Child mental health professionals were unsure what resources were available and whether technology is safe, private or reliable. **Conclusions:** Despite positive attitudes towards technology, newer technologies were rarely used by child mental health professionals. An overall lack of knowledge about resources along with concerns about safety and reliability may account for the slow uptake of technology within CAMHS. These issues need addressing to maximise implementation, perhaps through training or workshops.

Key Practitioner Message

- Technology can help to address barriers to accessing child and adolescent mental health services.
- Young people are avid users of technology and are therefore well placed to benefit from its use in health care.
- Child mental health professionals' attitudes are instrumental in successful implementation of technology.
- Child mental health professionals hold positive attitudes towards technology, but are unsure what resources are available and whether they are safe, reliable and private.
- Training child mental health professionals in the use of technology could increase the accessibility and availability of mental health interventions and support.

Keywords: adolescence; Intervention; mental health; prevention

Introduction

Technology in mental health care

Technology-based tools that support individuals in assessing, managing and treating mental health issues are being harnessed by the NHS to digitise health care and address some of the challenges that growing demands on services pose (NHS England, 2017). One area that is struggling to meet increasing demand is child and adolescent mental health, where up to 1 in eight children and young people now suffer from a mental health disorder (NHS Digital, 2018). This has led to long waiting lists and difficulties accessing services, with less than one-quarter of young people with mental health difficulties in the UK accessing treatment (Ford, Hamilton, Meltzer, & Goodman, 2007). Technology offers the potential to increase the capacity of child and adolescent mental

health services (CAMHS), promote greater self-management of health, and enable easier, quicker access to support. Furthermore, technology can help to engage those who struggle with face-to-face interactions, address stigma associated with attending face-to-face CAMHS appointments (Persson, 2018), and its 24/7 availability means it can be immediately accessed in times of crises (Kshirsagar, Morris, & Bowman, 2017).

Technologically supported interventions have evolved rapidly and range from interventions such as computerised CBT (cCBT) (Pennant et al., 2015) and smartphone applications (apps) (Grist, Cliffe, Denne, Croker, & Stallard, 2018), through to the use of telecommunications such as text messaging, emailing and video conferencing (Hollis et al., 2017). The functions of these technologies include the provision of psychoeducation

(Jones et al., 2018), prevention (Perry, Werner-Seidler, Calear, & Christensen, 2016) and mood monitoring (Dubad, Winsper, Meyer, Livanou, & Marwaha, 2018). The flexibility of these programs allows them to span computer, web and mobile platforms, and to augment treatment as usual or be offered as a standalone intervention (Barak, Klein, & Proudfoot, 2009). There is already a growing evidence base suggesting that these tools significantly reduce symptoms of anxiety (Firth et al., 2017), psychosis (Freeman et al., 2017) and depression (Merry et al., 2012), with the National Institute for Health and Care Excellence (NICE) now recommending digital cognitive behavioural therapy for depression in both adults and young people (NICE, 2019).

Young people and technology

The use of technology is near universal among young people, with 98% of children and adolescents in the UK having access to the Internet (Ofcom, 2017). This suggests that young people are well placed to benefit from the use of technology in health care; additionally, a survey of adolescent girls found that around half of those with mental health issues would be open to receiving support via digital technology (Grist et al., 2018). Overall, it is evident that expanding technology into mental health care could provide an accessible and welcome solution to some of the barriers that young people face when seeking support for their mental health.

Technology in practice

Despite the rapid development in mental health technologies, it is not necessarily reflected in comparable changes in professional beliefs or practice (Patrick et al., 2016; Schueller, Washburn, & Price, 2016). Theoretical frameworks related to the adoption of technology in health care have identified several areas instrumental in implementation, one of which being the attitudes and knowledge of the intended users (Greenhalgh et al., 2017). Further, their attitudes towards technology in health care have been identified as either facilitating or hindering its use (Hollis et al., 2017). Despite this, their attitudes are not currently well understood. In terms of working with adults, Carper, McHugh, and Barlow (2013) and Donovan, Poole, Boyes, Redgate, and March (2015) found child mental health professionals' lack of knowledge about computerised interventions as a major barrier to use. Kuhn et al. (2014) identified child mental health professional age as important and noted that positive attitudes towards a smartphone app for post-traumatic stress disorder were associated with younger age. Meisel, Drury, and Perera-Delcourt (2018) identified that while Improving Access to Psychological Therapies (IAPT) mental health professionals acknowledged advantages of cCBT, they believed that the lack of a therapeutic relationship would lead to worse outcomes.

With regard to working with young people, Stallard, Richardson, and Velleman (2010) assessed child mental health professionals' attitudes towards using computerised cognitive behaviour therapy (cCBT). The lack of therapist contact and support was highlighted as a major disadvantage, while early access, reduced stigma and the ability to use at home were all noted as advantages. In Sweden, although CAMHS

professionals believed that cCBT could be an effective tool for prevention or for intervening with mild to moderate problems, the majority had never used it (Vigerland et al., 2014). Similarly, Fleming and Merry (2013) noted that Australian youth workers were cautious about using cCBT with adolescents. While they valued its potential therapeutic power, they were concerned about client safety.

In summary, child mental health professionals' attitudes towards the use of digital technology are largely unknown. Given the rapid pace of digital development and its potential to increase service capacity by supporting and delivering interventions, understanding child mental health professionals' attitudes is essential to successful implementation. This study sought to answer the following questions:

- 1 Do child mental health professional's currently use technology in their everyday practice?
- 2 What are child mental health professional's attitudes towards technology?
- 3 Do any factors influence child mental health professional's attitudes towards using technology in practice?

Method

Design

This was a cross-sectional study. Participants completed an anonymous online survey that was built using the eSurv platform.

Participants

All 320 clinical members of staff working within CAMHS provided by Oxford Health NHS Foundation Trust were invited by email to participate in the survey. Reminder emails were sent 2 and 4 weeks later. The survey was open for 4 months. Ninety-seven individuals responded within the first 2 months and 57 individuals responded in the last 2 months.

Measures

Informed by previous studies, an online survey was developed consisting of a combination of free text and forced choice responses.

Do child mental health professionals currently use technology in their everyday practice? Respondents were asked to rate how often they were currently using a range of technologies such as smartphone apps, online CBT and social media: 'never', 'every 6 months', 'every 3 months', 'monthly' or 'weekly'.

What are child mental health professional's attitudes towards technology? Participants were asked to indicate their level of agreement to 27 statements: 'strongly disagree', 'disagree', 'neither agree/disagree', 'agree', 'strongly agree'. The statements were developed by the researchers but were informed by previous research. Specifically, statements were grouped into child mental health professional's knowledge and skills (three items), accessibility and availability (seven items), technological functioning and safety (five items), use in therapy (eight items) and wider role of technology (four items). Child mental health professionals' lack of knowledge about technological interventions has previously been identified as a barrier to its use (Donovan et al., 2015). Access and availability have been identified by a number of researchers who have highlighted the convenience and quicker access to mental support and

information (Carper et al., 2013; Musiat, Goldstone, & Tarrier, 2014; Schueller et al., 2016), potential to reduce stigma, appeal and 24/7 availability offered by technology (Meisel et al., 2018; Musiat et al., 2014; Stallard et al., 2010). Technological functioning includes concerns about safety, privacy (Gibson, Simms, O'Donnell, & Molyneaux, 2009; Kuhn et al., 2014), reliability and cost (Schueller et al., 2016). The role of technology to deliver interventions have raised child mental health professionals' concerns about a lack of therapist contact (Meisel et al., 2018; Stallard et al., 2010) and a child mental health professional preference for face-to-face treatment (Musiat et al., 2014). Finally, child mental health professionals' perceptions of the wider role of technology has identified views about the use of technology for prevention (Stallard et al., 2010; Vigerland et al., 2014), an adjunct to face-to-face interventions (Tonn et al., 2017), as well as an effective treatment for a range of disorders (Donovan et al., 2015).

Do any factors influence child mental health professional's attitudes towards using technology in practice? Demographic and professional information including age, gender, professional grouping and years of experience working in child mental health were collected. Professionals were also asked to rate: (a) their technological competence (0 = novice – 10 = expert) as this has been found to predict comfort using computers in therapy (Donovan et al., 2015), and (b) their perception of the helpfulness of technology (0 = not helpful – 10 = very helpful) as this has been identified as a consistent facilitator to incorporating technology in practice (Gagnon et al., 2012).

At the end of the questionnaire, child mental health professionals were invited to write anything else they would like to say about the use of technology in CAMHS.

Ethics and consent

The study was sponsored by Oxford Health NHS Foundation Trust and was approved by the Health Research Authority (IRAS ID 246244). Participants were first presented with an online information sheet about the survey and were informed that by clicking 'next' they were agreeing to give their consent to complete the questionnaire.

Statistical analysis

One hundred fifty-four (48.2%) out of the 320 invited individuals began the survey and 120 completed it. As the survey platform enabled forced response, there were no missing data within the sections.

As in Kuhn et al. (2014), there were no significant differences on competence, helpfulness or technology use between younger age groups (18–24, 25–34, 35–44) or older age groups (45–54, 55–64, 65+), and so due to small age subgroup sizes, age was dichotomised into 18–44 (57.1%, $n = 88$) and 45+ (42.2%, $n = 65$); one person preferred not to disclose their age.

Differences in attitudes towards using technology in practice between age groups, professions, gender, experience or level of technology use were explored. For the latter, frequencies of technology use were totalled (all responses excluding 'never') for each participant (labelled 'Total using' in Table 2) and the median (19, $n = 134$) was used to dichotomise the sample into high (49.3%, $n = 66$) or low (50.7%, $n = 68$) technology users. This approach was similar to Donovan et al. (2015) who identified high and low intenders in their sample to explore any impact on attitudes.

Independent *t*-tests were performed to explore differences in mean perceived competence and usefulness of technology in practice between high and low technology users, and between the younger and older groups. Chi-square tests were performed to assess any significant relationships between the groups and their attitudes towards technology. For the purpose of analyses, responses to the attitudes question were grouped. Responses indicating 'strongly disagree' were incorporated into 'disagree' and those indicating 'strongly agree' were incorporated into 'agree'.

Results

Participant demographics

Demographic information for the 154 participants can be found in Table 1. All core professionals who constitute community CAMHS were represented in the survey with the largest single group being nursing followed by Clinical Psychology. Overall, respondents were predominantly females aged 44 and under, with 10 or more years of experience working in CAMHS.

Do child mental health professionals currently use technology in everyday practice?

A summary of technology use can be found in Table 2. Of those who used each technology at least monthly, helplines were the most commonly used (76.9%; 93/121) followed by websites (74.6%; 85/114), smartphone apps (70.1%; 75/107) and online support services (70.2%; 59/84). In terms of the specific resources used, the emergency helplines 'Childline', 'Samaritans' and 'Papyrus' were most frequently mentioned. Twenty different smartphone apps were identified by respondents, with the most popular being for emotional management ('Calm Harm', 'SAM' and 'Blueice') and for mindfulness ('Headspace'). Similarly, 17 websites and online support services were listed, such as 'Kooth', 'Mood Juice', 'Beat' and 'Mermaids'.

What are child mental health professional's attitudes towards using technology?

Respondents rated themselves to be generally competent at using technology ($M = 6.24$, $SD = 1.63$), and rated technology to be quite helpful in their clinical practice ($M = 6.68$, $SD = 1.97$).

Respondent attitudes are summarised in Table 3.

Child mental health professional knowledge and skills. The majority of the sample agreed that they did not know what technology is available (60.8%, 73/120) with 41.7% (50/120) not feeling skilled or confident in this area.

Accessibility and availability. Respondents overwhelmingly perceived technology as appealing to young people (89.2%, 107/120) and helpful in engaging those

Table 1. Participant demographics (N , %)

	High users	Low users	All
Gender			
Male	11	7	18
Female	55	61	116
Age			
18–44	41	38	79
45+	25	29	54
Years of experience			
<1 to 9	33	40	73
10+	33	28	61
Profession			
Clinical psychologists	13	16	29
Nursing	21	19	40
Social work	9	9	18
Therapies	5	13	18
Psychiatry	9	7	16
Other	9	4	13

Table 2. Technology use across the sample (N, %)

	Never	Every 6 months	Every 3 months	Monthly	Weekly	Total using
Smartphone apps	27 (20.1)	17 (12.7)	15 (11.2)	35 (26.1)	40 (29.9)	107 (79.9)
Websites	20 (14.9)	10 (7.5)	19 (14.2)	43 (32.1)	42 (31.3)	114 (85.1)
Online support	50 (37.3)	7 (5.2)	18 (13.4)	29 (21.6)	30 (22.4)	84 (62.7)
Online CBT	69 (51.5)	13 (9.7)	24 (17.9)	18 (13.4)	10 (7.5)	65 (48.5)
Online chat rooms	100 (74.6)	10 (7.5)	9 (6.7)	10 (7.5)	5 (3.7)	34 (25.4)
Online forums	109 (81.3)	4 (3)	10 (7.5)	9 (6.7)	2 (1.5)	25 (18.7)
Telemedicine	82 (61.2)	9 (6.7)	14 (10.4)	18 (13.4)	11 (8.2)	52 (38.9)
Helplines	13 (9.7)	12 (9)	16 (11.9)	46 (34.3)	47 (35.1)	121 (90.3)
Computerised cognitive therapy	91 (67.9)	9 (6.7)	15 (11.2)	15 (11.2)	4 (3)	43 (32.1)
Video sessions	79 (59)	19 (14.2)	14 (10.4)	16 (11.9)	6 (4.5)	55 (41)
Social media	120 (89.6)	4 (3)	2 (1.5)	5 (3.7)	3 (2.2)	14 (10.5)
Instant messaging	92 (68.7)	3 (2.2)	9 (6.7)	10 (7.5)	20 (14.9)	42 (31.3)
Email	44 (32.8)	5 (3.7)	22 (16.4)	25 (18.7)	38 (28.4)	90 (67.2)
Youtube/Videos	44 (32.8)	19 (14.2)	23 (17.2)	32 (23.9)	16 (11.9)	90 (67.2)
VR/Avatar Therapy	124 (92.5)	3 (2.2)	3 (2.2)	2 (1.5)	2 (1.5)	10 (7.5)
Computer games	128 (95.5)	1 (0.7)	0	4 (3)	1 (0.7)	6 (4.5)
Blogs/Vlogs	112 (83.6)	8 (6)	4 (3)	9 (6.7)	1 (0.7)	22 (16.4)
Podcasts	91 (72.4)	12 (9)	12 (9)	10 (7.5)	3 (2.2)	37 (27.6)

struggling with face-to-face interventions (85%, 102/120). It was perceived to be convenient (91.7%, 110/120), accessible 24/7 (84.2%, 101/120), and able to offer earlier access to mental health help (80.8%, 97/120).

Functioning and safety. Child mental health professionals were unable to express a definitive view on some of the more technical statements. A significant proportion responded 'neither agree/disagree', to the items asking about whether technology was private or secure (50%, 60/120), safe and did not expose young people to risk (51.7%, 62/120) and reliable (47.5%, 57/120).

Use in therapy. Very few (18.3%, 22/120) thought that technology provided a solution to a lack of trained therapists.

Wider role of technology. Respondents strongly endorsed statements that it helps with prevention and psychoeducation (91.7%, 110/120), provides access to a wide range of resources (88.3%, 106/120) and offers peer support (84.2%, 101/120).

Do any factors influence child mental health professional's attitudes towards using technology in practice? There were no differences in attitudes towards technology between the different professions or genders. However, age and frequency of technology use did influence attitudes.

Those aged 18–44 rated themselves as significantly more competent at using technology ($t(149) = 4.26$, $p < .001$), and rated technology to be significantly more helpful in their clinical practice, ($t(83.54) = 3.21$, $p = .003$) than those aged 45+. Levene's test indicated unequal variances ($F = 6.32$, $p = .13$), so degrees of freedom were adjusted from 117 to 83.54.

Similarly, high users rated themselves as significantly more competent at using technology ($t(132) = -2.73$, $p = .007$) and rated technology as significantly more helpful ($t(114.53) = 2.48$, $p = .015$) than low users. Levene's test indicated unequal variances ($F = 4.01$, $p = .048$), so degrees of freedom were adjusted from 118 to 114.53.

Significantly, more participants aged 45+ agreed with the statement 'I don't feel skilled or confident in this area' than participants aged 18–44 ($\chi^2 (1, 97) = 10.82$, $p = .004$).

Similarly, low users did not feel skilled or confident ($\chi^2 (1, 97) = 15.67$, $p = <.001$), did not know what is available to use ($\chi^2 (1, 95) = 15.44$, $p = <.001$) and perceived technology as not safe and can expose young people to risk ($\chi^2 (1, 58) = 6.28$, $p = .012$) compared to high users.

Discussion

Principal findings

Overall, respondents perceived technology to be helpful in their clinical work with every type of identified technology being used at least once in the past week. Older technologies such as helplines and websites were commonly used across the sample, with newer technologies such as computer games and VR/Avatar therapy rarely being used. This mirrors previous research about the sequential uptake of emerging technologies. Gibson et al. (2009) noted that 80% of mental health workers had referred individuals to a website for support, whereas only 4% had used videoconferencing with service users. However, given the 10-year difference between those findings and the current study, it suggests that there is a significant gap between the development of new technologies and their uptake within clinical services. This may reflect the time involved in obtaining data about effectiveness, and questions whether different and quicker methods are required to establish sufficient evidence to support their use.

Child mental health professionals identified a number of benefits of using technology that corroborated those found in previous studies. These included convenience (Schueller et al., 2016), accessibility (Carper et al., 2013) and appeal to service users (Musiat et al., 2014). Child mental health professionals identified a clear role for technology as a preventative/psychoeducational tool rather than a replacement for face-to-face therapy. While child mental health professionals felt that technology can provide effective treatment and help develop self-

Table 3. Attitudes across the sample (N, %)

	Disagree	Agree	Neither agree/disagree
Child mental health professional knowledge and skills			
Not enough evidence	44 (36.7)	23 (19.2)	53 (44.2)
Don't feel skilled/confident in this area	47 (39.2)	50 (41.7)	23 (19.2)
Don't know what's available	22 (18.3)	73 (60.8)	25 (20.8)
Accessibility and availability			
Helps to engage those who struggle with f2f	4 (3.3)	102 (85)	14 (11.7)
Avoids stigma of going to CAMHS	20 (16.7)	49 (40.8)	51 (42.5)
It's appealing to YP	3 (2.5)	107 (89.2)	10 (8.3)
Available 24/7	4 (3.3)	101 (84.2)	15 (12.5)
Easily accessed no matter where you live	18 (15)	79 (65.8)	23 (19.2)
Convenient & can be used at home	4 (3.3)	110 (91.7)	6 (5)
Earlier access to MH help and info	6 (5)	97 (80.8)	17 (14.2)
functioning and safety			
Not private/secure	40 (33.3)	20 (16.7)	60 (50)
Not safe and can expose YP to risk	25 (20.8)	33 (27.5)	62 (51.7)
Not reliable	32 (26.7)	31 (25.8)	57 (47.5)
Encourages screen/online time	12 (10)	62 (51.7)	46 (38.3)
Costs money to use	25 (20.8)	33 (27.5)	62 (51.7)
Use in therapy			
Not tailored to individual's needs	19 (15.8)	50 (41.7)	51 (42.5)
Solution to lack of trained therapists	67 (55.8)	22 (18.3)	31 (25.8)
Reduces need for f2f meetings	33 (27.5)	44 (36.7)	43 (35.8)
Damages therapeutic relationship	61 (50.8)	9 (7.5)	50 (41.7)
Reduces engagement/motivation	66 (55)	7 (5.8)	47 (39.2)
Can provide effective treatment	7 (5.8)	67 (55.8)	46 (38.3)
MH problems require f2f support	28 (23.3)	42 (35)	50 (41.7)
Speed up treatment	6 (5)	63 (52.5)	45 (37.5)
Wider role of technology			
Helps develop better self-management	6 (5)	67 (55.8)	47 (39.2)
Peer support/connects community	4 (3.3)	101 (84.2)	15 (12.5)
Access wide array of info and resources	2 (1.7)	106 (88.3)	12 (10)
Helps prevention/psychoeducation	2 (1.7)	110 (91.7)	8 (6.7)

management, they did not see it as a solution to a lack of trained therapists or as a way of reducing the need for face-to-face meetings.

Respondents rated themselves as generally competent at using technology, with younger child mental health professionals rating their competence, skill and confidence higher than the older group. This is consistent with previous research where younger participants were more likely to use an app in their clinical work than older participants (Kuhn et al., 2014). However, both age groups were unsure about what technology is available and the technical aspects regarding privacy and security, reliability, safety or the possibility of exposing young people to risk. The overall lack of knowledge among child mental health professionals, particularly among older groups and those who do not regularly use technology, are consistent with previous research (Carper et al., 2013). While child mental health professionals may feel competent in using technology and keen to incorporate it into their work with young people, it seems they are unsure of what options are available to them.

Implications

Technology offers opportunities to overcome some of the barriers that young people face in accessing child mental health services. Previous findings have identified that young people are amenable to accessing mental health support digitally yet, successful implementation is largely reliant on child mental health professional's knowledge, confidence and attitudes towards it.

This study highlights that despite the overall positive attitude towards technology held by child mental health professionals in this sample, many recent technologies are still not being utilised. This may reflect the limited availability of newer technologies such as virtual reality. However, even some of the more established technologies such as instant messaging and online forums were rarely being used. Child mental health professionals' uncertainty about the safety and reliability of resources, and their lack of knowledge on what is available, must be addressed in order to incorporate technology into clinical services. This could be achieved through training and workshops where evidence-based resources are explained and demonstrated to child mental health professionals, perhaps by service users themselves, or other members of staff. Research has previously found that a brief and simple presentation about computerised therapy led to an increased intention to use it (Donovan et al., 2015). Similarly, two previous studies found that demonstrating the technology/intervention, rather than just hearing about it, increased acceptability ratings and interest in use (Fleming & Merry, 2013; Mitchell & Gordon, 2007).

Limitations

Although this study employed a large and varied sample, limitations must be acknowledged. First, the use of an Internet-based questionnaire did not allow for detailed responses. While some open questions were included, the anonymity of the questionnaire restricted any follow-

up of participants to further explore their attitudes. Future research may benefit from conducting semi-structured interviews to develop a deeper understanding in this area.

Second, this study was restricted to child mental health professionals within a single NHS Trust and we are therefore unable to generalise these findings to other services. The Oxford Health NHS Foundation Trust is one of seven mental health Global Digital Exemplars (GDE) identified as a digitally advanced mental health trust. The staff in this survey may therefore be more familiar with technology, and indeed, projects around the use of online CBT (IESO), computerised programs (Sleepio; Cliffe, Croker, Denne, & Stallard, 2018), avatar therapy (ProReal; Falconer, Grist, Davies, & Stallard, 2019) and smartphone apps (BlueIce; Stallard, Porter, & Grist, 2018) are currently underway in this specific Trust. Other Trusts may be at different stages of digital development and may have access to other technological resources, programs and training. Child mental health professional knowledge, perception of helpfulness and use may be different. Future research should extend recruitment to gain a broader insight into child mental health professionals' attitudes towards and use of technology.

Third, although all professional groups were represented in the survey, only half of those approached completed the survey. It is therefore probable that the results presented here are from those more interested and favourably disposed towards the use of technology. As such, our results may over-estimate the actual use of technology within CAMHS and may present more positive attitudes towards it use.

In conclusion, our results suggest a slow uptake of digital technology within CAMHS. Technology is perceived to be appealing to young people and offers benefits around accessibility, as well as having a role in the development of preventive/psychoeducational interventions. However, child mental health professionals lack knowledge about the digital resources available and have concerns about safety, reliability and risk. Addressing this gap in knowledge is essential if digital technology is to become fully integrated within clinical services.

Acknowledgements

Funding for this project was provided by the Health Foundation. P.S. conceived the idea and designed the study; B.C., A.M. and M.D. developed the online questionnaire with B.C. undertaking the data analysis. All authors participated in the interpretation of findings, contributed core ideas, and read and approved the final manuscript. P.S. had full access to all the data in the study and takes responsibility for the integrity of the data in the study and the accuracy of the data analysis. The authors would like to thank all those who completed this survey. The authors have declared that they have no competing or potential conflicts of interest.

Ethical information

This study was approved by the Health Research Authority (IRAS ID 246244) on 29th June 2018. Participants were first presented with an online information sheet about the survey and were informed that by clicking 'next' they were agreeing to give their consent to complete the questionnaire.

Correspondence

Paul Stallard, Department for Health, University of Bath, 6.10 Wessex House, Bath BA2 7AY, UK; Email: p.stallard@bath.ac.uk

References

- Barak, A., Klein, B., & Proudfoot, J. G. (2009). Defining internet-supported therapeutic interventions. *Annals of Behavioral Medicine*, 38, 4–17.
- Carper, M. M., McHugh, R. K., & Barlow, D. H. (2013). The dissemination of computer-based psychological treatment: A preliminary analysis of patient and clinician perceptions. *Administration and Policy in Mental Health and Mental Health Services Research*, 40, 87–95.
- Cliffe, B., Croker, A., Denne, M., & Stallard, P. (2018). Supported web-based guided self-help for insomnia for young people attending child and adolescent mental health services: Protocol for a feasibility assessment. *JMIR Research Protocols*, 7, e11324.
- Donovan, C. L., Poole, C., Boyes, N., Redgate, J., & March, S. (2015). Australian mental health worker attitudes towards cCBT: What is the role of knowledge? Are there differences? Can we change them? *Internet Interventions*, 2, 372–381.
- Dubad, M., Winsper, C., Meyer, C., Livanou, M., & Marwaha, S. (2018). A systematic review of the psychometric properties, usability and clinical impacts of mobile mood-monitoring applications in young people. *Psychological Medicine*, 48, 208–228.
- Falconer, C. J., Grist, R., Davies, E. B., & Stallard, P. (2019). Avatar-based virtual reality in CAMHS talking therapy: Two exploratory case studies. *Child and Adolescent Mental Health*. In press. <https://doi.org/10.1111/camh.12326>. [last accessed 25 March 2019].
- Firth, J., Torous, J., Nicholas, J., Carney, R., Rosenbaum, S., & Sarris, J. (2017). Can smartphone mental health interventions reduce symptoms of anxiety? A meta-analysis of randomized controlled trials. *Journal of Affective Disorders*, 218, 15–22.
- Fleming, T., & Merry, S. (2013). Youth work service providers' attitudes towards computerized CBT for adolescents. *Behavioural and Cognitive Psychotherapy*, 41, 265–279.
- Ford, T., Hamilton, H., Meltzer, H., & Goodman, R. (2007). Child mental health is everybody's business: The prevalence of contact with public sector services by type of disorder among British school children in a three-year period. *Child and Adolescent Mental Health*, 12, 13–20.
- Freeman, D., Sheaves, B., Goodwin, G. M., Yu, L.-M., Nickless, A., Harrison, P. J., ... & Espie, C. A. (2017). The effects of improving sleep on mental health (OASIS): A randomised controlled trial with mediation analysis. *The Lancet Psychiatry*, 4, 749–758.
- Gagnon, M.-P., Desmartis, M., Labrecque, M., Car, J., Pagliari, C., Pluye, P., ... & Légaré, F. (2012). Systematic review of factors influencing the adoption of information and communication technologies by healthcare professionals. *Journal of Medical Systems*, 36, 241–277.
- Gibson, K., Simms, D., O'Donnell, S., & Molyneaux, H. (2009, October). *Clinicians' attitudes toward the use of information and communication technologies for mental health services in remote and rural area*. Available from: http://firstmile.ca/wp-content/uploads/2015/03/2009-Gibson_et_al_CST-final.pdf. [last accessed 13 February 2019].
- Greenhalgh, T., Wherton, J., Papoutsis, C., Lynch, J., Hughes, G., Hinder, S., ... & Shaw, S. (2017). Beyond adoption: A new framework for theorizing and evaluating nonadoption, abandonment, and challenges to the scale-up, spread, and sustainability of health and care technologies. *Journal of Medical Internet Research*, 19, e367.
- Grist, R., Cliffe, B., Denne, M., Croker, A., & Stallard, P. (2018). An online survey of young adolescent girls' use of the internet

- and smartphone apps for mental health support. *Bjpsych Open*, 4, 302–306.
- Hollis, C., Falconer, C., Martin, J., Whittington, C., Stockton, S., Glazebrook, C., & Davies, B. (2017). Annual research review: Digital health interventions for children and young people with mental health problems – A systematic and meta-review. *Journal of Child Psychology and Psychiatry*, 58, 474–503.
- Jones, R. B., Thapar, A., Stone, Z., Thapar, A., Jones, I., Smith, D., & Simpson, S. (2018). Psychoeducational interventions in adolescent depression: A systematic review. *Patient Education and Counseling*, 101, 804–816.
- Kshirsagar, R., Morris, R., & Bowman, S. (2017). *Detecting and explaining crisis*. ArXiv:1705.09585 [Cs]. Available from: <http://arxiv.org/abs/1705.09585>. [last accessed 13 February 2019].
- Kuhn, E., Eftekhari, A., Hoffman, J. E., Crowley, J. J., Ramsey, K. M., Reger, G. M., & Ruzek, J. I. (2014). Clinician perceptions of using a smartphone app with prolonged exposure therapy. *Administration and Policy in Mental Health and Mental Health Services Research*, 41, 800–807.
- Meisel, S. F., Drury, H., & Perera-Delcourt, R. P. (2018). Therapists' attitudes to offering eCBT in an inner-city IAPT service: A survey study. *The Cognitive Behaviour Therapist*, 11, e11.
- Merry, S. N., Stasiak, K., Shepherd, M., Frampton, C., Fleming, T., & Lucassen, M. F. G. (2012). The effectiveness of SPARX, a computerised self help intervention for adolescents seeking help for depression: Randomised controlled non-inferiority trial. *BMJ*, 344, e2598.
- Mitchell, N., & Gordon, P. K. (2007). Attitudes towards computerized CBT for depression amongst a student population. *Behavioural and Cognitive Psychotherapy*, 35, 421–430.
- Musiat, P., Goldstone, P., & Tarrier, N. (2014). Understanding the acceptability of e-mental health – Attitudes and expectations towards computerised self-help treatments for mental health problems. *BMC Psychiatry*, 14, 109.
- NHS Digital (2018, November 22). *Mental health of children and young people in England*. Available from: <https://digital.nhs.uk/data-and-information/publications/statistical/mental-health-of-children-and-young-people-in-england/2017/2017> [last accessed 13 February 2019].
- NHS England (2017). *Next steps on the NHS five year forward view*. Available from: <https://www.england.nhs.uk/publication/next-steps-on-the-nhs-five-year-forward-view/>. [last accessed 20 February 2019].
- NICE (2019). *Depression in children and young people: Identification and management*. Available from: <https://www.nice.org.uk/news/article/offer-digital-cbt-to-young-people-with-mild-depression-nice-says>. [last accessed 13 February 2019].
- Office of Communications (2017, November 29). *Children and parents: Media use and attitudes report 2017*. Available from: <https://www.ofcom.org.uk/research-and-data/media-literacy-research/childrens/children-parents-2017>. [last accessed 10-04-2018].
- Patrick, K., Hekler, E. B., Estrin, D., Mohr, D. C., Riper, H., Crane, D., ... & Riley, W. T. (2016). The pace of technologic change: Implications for digital health behavior intervention research. *American Journal of Preventive Medicine*, 51, 816–824.
- Pennant, M. E., Loucas, C. E., Whittington, C., Creswell, C., Fonagy, P., Fuggle, P., ... & Expert Advisory Group (2015). Computerised therapies for anxiety and depression in children and young people: A systematic review and meta-analysis. *Behaviour Research and Therapy*, 67, 1–18.
- Perry, Y., Werner-Seidler, A., Caele, A. L., & Christensen, H. (2016). Web-based and mobile suicide prevention interventions for young people: A systematic review. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, 25, 73–79.
- Persson, J. K. (2018). *Clinician attitudes towards, and patient well-being outcomes from, computerised Cognitive Behavioural Therapy: A research portfolio*, 182. Edinburgh: University of Edinburgh.
- Schuller, S. M., Washburn, J. J., & Price, M. (2016). Exploring mental health providers' interest in using web and mobile-based tools in their practices. *Internet Interventions*, 4, 145–151.
- Stallard, P., Porter, J., & Grist, R. (2018). A smartphone app (BlueIce) for young people who self-harm: Open phase 1 pre-post trial. *JMIR mHealth and uHealth*, 6, e32.
- Stallard, P., Richardson, T., & Velleman, S. (2010). Clinicians' attitudes towards the use of computerized cognitive behaviour therapy (cCBT) with children and adolescents. *Behavioural and Cognitive Psychotherapy*, 38, 545–560.
- Tonn, P., Reuter, S. C., Kuchler, I., Reinke, B., Hinkelmann, L., Stöckigt, S., ... & Schulze, N. (2017). Development of a questionnaire to measure the attitudes of laypeople, physicians, and psychotherapists toward telemedicine in mental health. *JMIR Mental Health*, 4, e39.
- Vigerland, S., Ljótsson, B., Bergdahl Gustafsson, F., Hagert, S., Thulin, U., Andersson, G., & Serlachius, E. (2014). Attitudes towards the use of computerized cognitive behavior therapy (cCBT) with children and adolescents: A survey among Swedish child mental health professionals. *Internet Interventions*, 1, 111–117.

Accepted for publication: 14 November 2019
Published online: 11 December 2019