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Citation for published version:

Quayle, E, Schwannauer, M, Radford, G, Bucci, S, Varese, F, Allsopp, K, Cartwright, K, Chan, C, Chitsabesan, P, Green, V, Hewins, W, Larkin, A, Newton-Braithwaite, A, Niebauer, E, Richards, C, Sandys, M, Shafi, S, Ward, J & Whelan, P 2024, 'Implementation of a digital health intervention for young people exposed to technology assisted sexual abuse', *Child Abuse and Neglect*, vol. 154, 106883, pp. 1-12.
<https://doi.org/10.1016/j.chiabu.2024.106883>

Digital Object Identifier (DOI):

[10.1016/j.chiabu.2024.106883](https://doi.org/10.1016/j.chiabu.2024.106883)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Publisher's PDF, also known as Version of record

Published In:

Child Abuse and Neglect

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Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Child Abuse & Neglect

journal homepage: www.elsevier.com/locate/chiabuneg

Implementation of a digital health intervention for young people exposed to Technology Assisted Sexual Abuse

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ARTICLE INFO

Keywords:

Adolescent
Mobile applications
Feasibility studies
Risk factors
Internet
Health care practitioners

ABSTRACT

Background: The internet has become a place of increased risk of abuse, including sexual abuse, for young people (YP). One potential risk factor to online abuse and exploitation is the ability to mentalise. We developed the i-Minds app, a mentalisation-based digital health intervention (DHI) for YP who have experienced technology assisted sexual abuse (TASA), which we tested in a clinical feasibility trial. Nested within the trial was a qualitative implementation study with clinicians who referred to the trial.

Objective: To explore the barriers and enablers to the future integration of i-Minds into clinical practice.

Participants and setting: Twelve HCPs were recruited from across two trial recruitment sites (Manchester and Edinburgh).

Methods: Semi-structured interviews were informed by Normalisation Process Theory (NPT). Framework analysis was used; transcripts were coded deductively to NPT constructs.

Results: Practitioners were positive about the need for, and added value of, the i-Minds app over existing interventions, including other DHIs. While they felt confident with the app, concerns remained around the safety of using the app without practitioner support. i-Minds promoted changes in practitioners' work and impacted online behaviour of YP. There was an identified need for further training and organisational support.

Conclusions: Practitioners are aware of TASA but have limited knowledge, skills and tools to work with TASA in clinical practice with YP. There is a need for awareness raising and education about

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<https://doi.org/10.1016/j.chiabu.2024.106883>

Received 18 December 2023; Received in revised form 22 May 2024; Accepted 30 May 2024

Available online 12 June 2024

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TASA and DHI. i-Minds offers a theory-informed DHI for working with YP exposed to TASA that is acceptable to practitioners and YP.

1. Background

Technology Assisted Sexual Abuse (TASA) includes an array of abusive and exploitative practices and in a US general population sample was experienced by approximately 15 % of children (Finkelhor et al., 2022). Prevalence varies across different types of abuse, but mostly involves the production and non-consensual sharing of sexual images by adults and peers (Finkelhor, Turner, Colburn, 2023; Mori et al., 2022). Survey data suggests that victims are primarily girls aged between 13 and 17 years (Ali et al., 2021; Finkelhor et al., 2022; Wachs et al., 2021) and children who are victimized online may also victimise others (Gámez-Guadix et al., 2022; Hsieh et al., 2023; Snaychuk & O'Neill, 2020; Sparks et al., 2023). However, other studies did not show gender difference in prevalence of TASA (Gamez-Guadix et al., 2023; Ortega-Baron et al., 2023; Pedersen et al., 2023). The disparity across studies may be related to differences in the measures used and how these forms of abuse were conceptualised.

Negative emotional impacts of TASA include self-harm, depression and anxiety (Schmidt, Varese, Larkin, & Bucci, 2023), along with self-blame and shame (Joleby et al., 2020; Stänicke et al., 2024). A recent scoping review clustered the negative impacts of TASA into emotional and psychological responses, medical and physical impacts, and negative consequences for relationships and the social environment (Chauviré-Geib & Fegert, 2024) and reported similarities in impact across different types of TASA. However, a key finding from a US sample indicated that episodes which related to the misuse of sexual images had a particularly negative impact on victims (Finkelhor, Turner, Colburn, 2023). Central to these experiences is the longevity of TASA-related distress and the role played by the perceived permanence of the images (Schmidt, Varese, et al., 2023).

There are many risk factors associated with TASA victimization, including prior sexual abuse (Titchen et al., 2019; Turner et al., 2023) and identifying as sexual minority (Gámez-Guadix & Incera, 2021), although, TASA victims may lack many of the usual risk factors (other negative early experiences, parental violence or family mental illness), and more often come from high socioeconomic backgrounds (Pedersen et al., 2022). One potential risk factor for TASA is the ability of young people (YP) to accurately estimate others' intentions and motivations, known as mentalisation (Borghesi et al., 2022). YP who are distressed or have problems with emotion regulation because of being victimized, abused, or exploited online may be at the greatest risk of developing difficulties in mentalizing, increasing the likelihood of repeated victimization and harm (Penner et al., 2019). High levels of online activity may also be related to a reduced ability to mentalize and be associated with high levels of emotional distress (Bersani et al., 2022), largely because signals of empathy and understanding are communicated more opaquely online (Locati et al., 2023). Difficulties in mentalising have been linked to greater vulnerability to mental health problems common among TASA survivors (Arabadzhev & Paunova, 2024; Guazzelli Williamson & Mills, 2022). However, increased adolescent mentalizing may help YP manage the complexity of social relationships across diverse contexts (Guazzelli Williamson & Mills, 2022). Therefore, improved mentalization capacity following a mentalization-based psychological intervention might result in improvements in two key intervention targets for YP exposed to TASA: (i) reducing the risk of revictimization and future harm and (ii) improving the emotional and mental well-being of users who might experience current distress due to TASA experiences.

Currently, child and adolescent services do not routinely ask YP about their online world, online relationships and TASA more specifically, and practitioners appear to lack the tools or referral routes to work with YP experiencing difficulties (Biddle et al., 2022; Idelji-Tehrani et al., 2023; Quayle et al., 2023; Schmidt, Bucci, et al., 2023). There are no internationally recommended evidence-based interventions for improving the mental health and well-being of YP who have experienced TASA. The UK National Institute for Health and Care Excellence (NICE) recommended further research on the efficacy of interventions aimed at improving well-being and relationships and preventing further harm following TASA (NICE, 2017). Recent systematic reviews and meta-analyses demonstrated that digitally-mediated psychological interventions represent effective treatment options for improving the mental health and well-being of YP across a range of problems, along with promoting healthy romantic relationships in adolescents and improving sexual health (Emerson et al., 2022; Pieramico, 2022; Saragih et al., 2024; Tiwari et al., 2023; Wright et al., 2023). When integrated within existing care pathways for YP, Digital Health Interventions (DHI) for YP exposed to TASA have the potential to be a cost-effective way to increase availability of support and provide timely therapeutic input that can be accessed at a time and in a familiar format to YP when traditional forms of support are not available (Stanic et al., 2023). To this end, we developed the i-Minds app, a theory-driven, co-designed, mentalisation-based DHI for YP aged 12–18 years who have experienced distress associated with TASA. i-Minds is a modular intervention that can be used as a standalone platform without restrictions, available over a 6-week intervention window. Following a mentalisation-based manual developed by members of our team (Griffiths et al., 2019), the aim of the DHI is to help YP understand the motives of both adults and peers, protect them from future abuse, and leave them feeling more confident in interpersonal interactions that may be ambiguous or challenging. The content of the app is organised into four key topics: i. mentalisation, ii. psychoeducation about TASA, iii. Emotional and mental health, and iv. trauma. We tested the feasibility, safety and acceptability of the i-Minds app using a non-randomised clinical trial designed with YP who have experienced distress associated with TASA (*in submission*). Forty-one participants were recruited from Child and Adolescent Mental Health Services (CAMHS) in Edinburgh and Greater Manchester, one sexual assault referral centre (SARC) in Greater Manchester, and an NHS-commissioned e-therapy provider. Participants showed high module completeness and engagement duration, suggesting the potential for real-world use. Details of the development of the app, our method of co-design, and our registered protocol are published elsewhere (Bucci et al., 2023). Nested within this trial was a qualitative implementation study with healthcare professionals. Informed by Normalisation Process Theory (May et al., 2018), healthcare

professionals (HCP) who referred YP to the i-Minds feasibility clinical trial were interviewed about their experiences of the app and study procedures. Findings from these interviews are the subject of the current study.

2. Objective

To explore the perspectives of HCP regarding their roles in the i-Minds trial, and the barriers and enablers relevant to future integration of the intervention into existing care pathways.

3. Methods

3.1. Participants

Participants were 12 HCP (10 in Edinburgh; 2 in Manchester; 10 women, 2 men), including three service managers. All interviews lasted between 45 and 125 min (mean = 67mins). Seven participants identified as White British, two as White Other, one as Pakistani, and two preferred not to answer; the age range was 27–53 years ($m = 42$). Most participants rated themselves as being comfortable or extremely comfortable using a range of technologies (e.g., social media, mobile phones, smartphones, Internet). Interviews were digitally recorded, transcribed and anonymised and uploaded to the end-to-end encrypted Dedoose qualitative software platform (Salmona et al., 2019).

3.2. Procedures

Institutional ethics approval was granted (REC Number 21/WS/0160) and the protocol was registered at [ClinicalTrials.gov](https://www.clinicaltrials.gov) (ClinicalTrials.gov Identifier: NCT05006053). Semi-structured interviews using an approved online platform were conducted by four trained researchers between June–August 2023, once the clinical feasibility trial was completed. Interviews were audio-recorded using encrypted digital recorders and transcribed verbatim. Fifty-four HCP who had referred YP to participate in the study were approached and 12 (22 %) agreed to be interviewed. No financial incentive was given. The interview schedule was developed by the research team in consultation with our stakeholder groups using the NPT framework. Questions and prompts were designed to evaluate how the i-Minds DHI had been implemented. Sampling continued until data sufficiency was reached.

3.3. Research design and data analysis

The analysis and interpretation of qualitative data can make an important contribution to research on implementation processes and outcomes (Bucci et al., 2019; Hogg et al., 2023; Vandrevala et al., 2023). Our qualitative study used the NPT coding framework (May et al., 2018) to inform the questions in our semi-structured interviews with Mental Health Practitioners (HCP) and the coding manual developed by the same authors (May et al., 2022), which consists of 4 constructs and associated secondary constructs (seen in Table 1). Responses to the open-ended interview questions were analysed using Framework Analysis, a qualitative approach that involves a systematic yet flexible process of organising, charting and arranging data in line with key themes and issues (Ritchie & Lewis, 2003). We used NPT as the thematic framework and codes were allocated to the text by EQ and SB and discussed with MS. Framework Analysis is a popular approach to management and analysis of qualitative data in health research (Gale et al., 2013; Oliver et al., 2022). The consolidated criteria for the reporting of qualitative research (COREQ) was used with regard to reflexivity and study design (Tong et al., 2007).

Table 1

Coding framework: Normalisation Process Theory constructs as operationalised for this study on practitioners' feedback of the i-Minds app.

Coherence	Cognitive participation	Collective actions	Reflexive monitoring
Differentiation: Is there a clear understanding of how HCP distinguish i-Minds from existing practice?	Initiation: How do key people drive i-Minds forwards?	Interactional workability: How do HCP do the work required by i-Minds and its components?	Systematisation: How are benefits or problems of i-Minds identified or measured?
Communal specification: How do HCP agree about the purpose of i-Minds and its components?	Enrolment: How do HCP get involved with i-Minds as an intervention?	Relational integration: How does using i-Minds and its components affect the confidence they have in each other?	Communal appraisal: How do HCP collectively judge the effectiveness of i-Minds?
Individual specification: How do HCP understand what i-Minds and its components requires of them?	Legitimation: To what extent do HCP agree that i-Minds is the right thing to do and should be part of their work?	Skill-set workability: How does i-Minds impact on HCP roles and training needs?	Individual appraisal: How do HCP individually appraise the value of i-Minds?
Internalisation: How do HCP construct the potential value of i-Minds for their work?	Activation: How do people continue to support i-Minds to sustain its implementation?	Contextual integration: Is there organisational support in terms of resourcing for i-Minds?	Reconfiguration: How do people think i-Minds should be modified in response to using it?

4. Results

The findings of this study are presented in line with the four NPT primary constructs related to “mechanisms of purposive social action” (May et al., 2022); coherence building, cognitive participation, collective action and reflexive monitoring. Each of these constructs has four associated secondary constructs (see Table 1). These are used where there was sufficient available data to support interpretation at this level of detail. Extracts are used throughout to evidence the findings.

4.1. Coherence

4.1.1. Differentiation

All participants were able to differentiate between their current clinical practice and what was offered by i-Minds and this was related to both in-person sessions as well as DHIs:

“This specifically focuses on online abuse which I think is great because actually it is something we do ask, but we maybe don’t routinely ask”. (EDI 02)

Practitioners felt that in their usual practice they would have understood TASA as sexual abuse without considering the difference technology made to the experiences of YP:

“I think it being something specific to online experienced abuse actually felt really important... I think it sometimes all gets lumped in together, but actually there are some really important nuances to experiencing it online...”. (MAN-02)

i-Minds was also seen as different because it allowed the YP to decide where, when and how they could access the app rather than this being determined by the practitioner. Many HCPs had already been using digital health interventions as part of their practice (largely driven by the pandemic) but they saw i-Minds as being different in that it was topic specific rather than generic in its content:

“I think it was just good because it was such a specific area, whereas if we think about the other apps, it is more mood, suicidal ideation, the generic mental health difficulties...” (EDI-07)

In addition, the app provided feedback of YP’s progress through a visual display (leaves appearing on a tree as each section was completed) and this was seen as empowering for YP:

“... the little bit that was different was the progress, the leaves on the tree. So the young people had a sense of how they were moving along on their own journey”. (ED-02)

While HCPs saw the benefit of the app as more than psychoeducation, it seemed important that they could differentiate it from traditional treatment models where therapeutic relationships were central. i-Minds was positioned as complimentary to, rather than replacing, routine therapy:

“I’m offering a therapeutic intervention, i-Minds is a programme that people could work through. I like that difference”. (EDI-09)

4.1.2. Communal specification

There were differences between participants in their understanding of which YP they should refer to i-Minds and why, and not all practitioners felt that they had been adequately informed about the study and its purposes or consulted about the app design, leaving them to feel that their involvement was limited (i.e. to recruit participants):

“... there was a general consensus that we are not being thought about as a service, we’re thought about as a source... that’s how it was positioned to start with as well that caused us a bit of alarm and a bit of umbrage” (EDI-09)

This perceived lack of consultation improved when a member of the research team attended weekly clinical meetings, and the value placed on this was obvious within one of the research site teams.:

“you were on the team meetings... in person, you were there... that just made a huge difference” (EDI-09)

However, having a member of the research team embedded in services was not possible across all services, which meant disparities in how much information was given about the intervention and people’s confidence in it were apparent across the transcripts:

“I guess being such a large service, so we have over 200 practitioners, it’s difficult for all of them to have the same level of understanding... so there were some practitioners that either didn’t know about it, or didn’t feel they knew very much about it, or kind of who could be referred to it.” (MAN-02).

This was particularly relevant to one recruiting service; even where HCP felt they were well-informed, concerns shared at team meetings remained around the potential for app content to cause distress for, and increase harm to, YP:

“There was a lot of anxiety, certainly amongst some of my colleagues, that this would be potentially traumatising or putting people at risk” (ED-01).

Related to this were concerns about how they as a team might manage some of these risks and whether they would be sufficiently

supported or resourced:

“... what it brings up for a young person and whether an app provides enough support for them with that... do colleagues and the team feel that they have enough training or knowledge to deal with that... it may lead to more disclosures...” (ED-04)

4.1.3. Individual specification

At an individual level, there was greater confidence that HCP understood how the app could be used and what was required of them:

“I just saw it as an additional resource to the work we’re doing... some additional information over and above what we already discussed... and self-guided, self-management type interventions that they might find useful” (EDI-10)

HCP understood that the aims of the app were around providing information and support and reducing the likelihood of future harm.

“... well something that would equip them to, well two things really... to manage the kind of feelings they were experiencing... but also to equip them with... a sense of how to navigate online spaces in a safer way”. (MAN-02).

However, for some HCP, there were gaps in their existing knowledge and understanding of TASA. This left them feeling uncertain about how they might manage questions from YP who were using the app:

“... I wouldn’t be able to say how the app works and all the different areas of it.. especially if a user came back and said I’ve been on the app and this is coming up...” (MAN-01)

4.1.4. Internalisation

i-Minds was seen to have value both as a stand-alone intervention as well as an adjunct to existing therapy in that helped YP understand what they had experienced online but also provided strategies to deal with this:

“... its value is that it can alter young people’s processes to understand their experiences further... normalise that they are not on their own with this and to acknowledge and validate how they’re feeling is OK...” (MAN-01)

“I also found it really helpful... one young person in particular would bring things to me during sessions that they’d found on i-Minds and ask me what I thought about it... really good for opening up conversations” (EDI-05)

One HCP had referred a YP to i-Minds without looking at the app or its content in any detail; the referral was made after the YP’s experience of TASA was identified during a formal child protection process – they were seen as a ‘good fit’ for the app:

“I just didn’t think about it to be honest... I didn’t have a lot of information about recruitment and who would be eligible and who wouldn’t... I didn’t give it a lot of thought to be honest. That’s probably something to reflect on”. (ED-03)

In other cases, HCP were much more engaged with the study and what the app could offer their clients. Earlier experiences of having worked with YP exposed to TASA was clearly of benefit to some, as these HCP were able to reflect on the suitability of i-Minds and its fit with how YPs interact and behave online:

“... she is a young person that might show me her phone in a session to say, look at this contact with my friends and we’ve fallen out and look at these terrible messages we’re saying to each other. I know that that’s something she would choose”. (ED-06)

4.2. Cognitive participation

4.2.1. Initiation

When asked which individuals had driven recruitment for i-Minds a frequent response was:

“Team leads”.

(ED-08)

Team leaders played a central role in driving recruitment to the i-Minds study. Service manager interviewees acknowledged that they gave constant reminders about the ongoing i-Minds trial in team meetings:

“... in every team meeting we have somebody coming to talk about a new service, which is great... but I think it is just a bit of keeping it in people’s minds” (EDI-04)

One service expended a significant amount of energy trying to engage staff with i-Minds through advertisements, training videos and providing digital links, but in fact this had not resulted in a consistent through-put of referrals from this service:

“So we had three main approaches... One was to put an advert in our online magazine... approach two was to let practitioners know about it... I put together some slides... a video walk-through of the app, the link to the i-Minds website...” (MAN-02).

4.2.2. Enrolment

Enrolment of YP was initiated by HCP identifying YP who met the inclusion criteria and informing them about the app. In the main, this proved to be quite straightforward because YP HCP approached already had knowledge of or experiences with TASA (even where they did not necessarily see it as a problem); this pre-existing knowledge gave context for practitioners to lean into:

“... a lot of the young people I was working with... already knew about it, they knew there were things happening online, so it was quite straightforward to say... there is a research study going on that is completely related to this, is that something you'd be interested in? (EDI-01)

HCP's also felt that in these instances it was possible to say to YP:

“We've now got this new app that's been designed directly for that” (ED-02).

In the main, any barriers to enrolment identified were staff being too busy, feeling that the app was not relevant to their client group or ongoing concerns about safety issues.

4.2.3. Legitimation

HCP felt that the app was appropriate for YP because it offered something that was relevant to them. This was discussed in the context of YP already using social media platforms to gain information about mental health:

“I think that all the young people that I referred, I was aware that they were using online apps and resources from, you know, TikTok to Instagram, around mental health. So it was certainly offering young people something in a field that they're very familiar with” (EDI-08).

It was also seen as appropriate to the presenting problems of YP:

“... i-Minds seemed more suited to their presenting dilemma”.

(ED-09)

Importantly, issues were raised about the timing of the intervention and that the i-Minds app fits with early intervention models of care:

“I think that early intervention... is always what we would want to be thinking about... rather than waiting”. (EDI-01)

4.2.4. Activation

There was less evidence of how HCP would continue to support i-Minds, which is perhaps not surprising given that this was a feasibility trial. However, there was discussion about how individual services might continue to use the app and why this would be important for their client group. i-Minds was seen as beneficial to both YP but also HCP themselves as the trial, in and of itself, made HCP more aware of the issue of TASA and the numbers of YP who may have had a TASA exposure:

“... it's to keep rolling it out as much as possible... it will be really beneficial for a lot of people... it definitely informed my practice around addressing it and exploring it further... it's really opened my eyes to how many go through this...” (MAN-01)

4.3. Collective action

4.3.1. Interactional workability

Referring YP to the study was not seen as necessarily increasing workloads, rather several interviewees said that they now routinely ask YP about TASA because of the i-Minds trial recruiting in their service:

“...I now routinely ask about online sexual experiences, positively and negatively”. (EDI-10)

Some practitioners said the i-Minds app was relevant to most YP on their caseload (rather than just for those who had experienced TASA) as it offered psychoeducation and promoted the rights of YP to be safe from sexually coercive relationships:

“... standing practice that we speak to and we are able to offer it as an adjunct to some of the work we do here”. (EDI-02)

This complemented much of the work that was already being done in some services:

“I think it complimented our services really well...”. MAN-01

However, HCP remained cautious about what would happen if the app was made universally available without support in relation to risks about safety and privacy:

“It would be nice if it could... run alongside clinicians and be available for other young people, but I would be more wary about it being available to everybody just around safety, privacy and that kind of thing”. (ED-07)

Of interest were comments about whether referring YP to use the app was perceived as adding to their workload:

“... just reassuring people that it doesn't become more work, it really hasn't been more work” (ED-05)

4.3.2. Relational integration

Most practitioners had confidence in the app, its content and how it might be used by YP:

“No, there is nothing about the app that worried me from a clinical perspective... even the person who wasn't happy with the study procedure... I don't think it impacted on our therapeutic relationship”.

(EDI-10)

However, some of interviewees expressed concerns about YP using the loaned handset to access inappropriate online sexual content or by taking sexual self-images:

“... we made an assumption that the devices they were given would be safe and secure... we were somewhat shocked when the devices were... used to access pornography... or sites that were not safe”. (ED-09)

“I think it was generally assumed that the phone that she was given would not have camera access but it turns out that it did and she did use that to take more images”. (ED-05)

HCP also discussed the importance of safety when referring YP to the trial and the need for a support system around them in case the app triggered distress:

“... it's really important to think about the support system around the young person and what could be potentially triggering for them, what's the safety net...”. (ED-07)

4.3.3. Skill-set workability

HCP largely felt confident about the fit between their role and using the app with their clients: “... it reinforced the work that you're doing... it complemented it nicely...” (ED-07)

However, because of the fast-paced advancements made in digital technology, they noted the need for regular training (rather than a discrete training event) about TASA and how YP engage with digital technology:

“... I think it should be part of our training... core training, not just one of those things you tick through” (MAN-01)

4.3.4. Contextual integration

HCP felt that they were given a choice as to whether they wanted to opt into referring a YP into the intervention; although, one participant said they felt some service pressure to refer clients into the trial without great knowledge of the app:

“... it seemed to be presented as a foregone conclusion that we would be referring our clients into the service... and it seemed as though we went into a more defensive position...”. (ED-09)

Making referral to the clinical feasibility trial was impacted by the capacity of the service and the potential creation of extra work without an increase in staff support. HCP were concerned that routinely asking YP about any TASA experiences, advertising the study in the service, and approaching YP about the topic would likely result in more YP being identified and needing therapeutic help:

“So I think that was one of the issues, there perhaps wasn't enough of us on our end”. (MAN-02)

HCP were also concerned that technical issues arising from using the app could not be supported by the service:

“... the sort of technical side that... which I don't know where that would come from resource wise”. (EDI-01)

4.4. Reflexive monitoring

4.4.1. Systematisation

Little was said about how benefits or problems with using the app were identified. Some HCP said that they only way to appraise the app was for them to use it themselves or when YP fed back to them about their experience of using the app.

“I always have a play round with the apps myself first”

(EDI-02)

“... well a lot of it is getting feedback from the young person, but you don't get that until after you've recommended the resource...”

(EDI-03)

4.4.2. Communal appraisal

Struggles were noted around collectively assessing whether i-Minds as an intervention was worthwhile:

“I think we did in team meetings and things like that. Probably not in that much depth. But I don't think there were any specific meetings about it” (EDI-05)

After the initial recruitment phase (when researchers presented the study at team meetings), there was little discussion about i-Minds in subsequent team meetings other than regarding ongoing safeguarding issues:

“We did discuss the app in terms of the safeguarding concerns around the young people who had used the devices inappropriately. And we did discuss around our feedback of the study in the early stages when the app was still in development...” (ED-08).

4.4.3. Individual appraisal

There was discussion about how HCP and their clients had used the app and how it impacted their work. Participants described the gains they had noticed YP had made, and their engagement with the app that had not been seen during therapy sessions:

“I do feel that the young person was quite empowered by it... I wasn't expecting her to engage so enthusiastically... because I really struggled to get this young person to engage at all... so it was really a pleasant surprise that they were enthusiastic to use it.” (EDI-03).

HCP also noticed change in some YPs behaviour while using the app via, for example, YP developing their own 'safety plans', changes in how YP used existing apps or how they shared social media content:

“There's definitely been a real change in how she responds to things online, how she keeps herself safe online, and just how she uses online” ED-04

However, these were largely HCP impressions - they had not directly discussed these observations with the YP:

“so neither of them talked about the use of the app in any detail in the sessions... and I didn't necessarily ask... I got a sense they may have stopped using it but I don't know that” (EDI-10)

4.4.4. Reconfiguration

When asked to give feedback about the app and anything they, or their clients, would have liked to change, HCP referred to both content and design. Suggestions for improvement included better linking the section on sexual behaviour to the psychosexual stage of the user, speech-to-text options where YP have difficulty reading or with their use of English, providing feedback to practitioners, and a section for caregivers:

“I personally would have liked there to be something for parents... quite a nice addition” (ED-01).

Importantly, a few practitioners noted that there were challenges in knowing whether any changes in how YP felt or behaved could be attributed to the app, as opposed to other factors, such as ongoing therapy:

“And I think we raised as a team, at the start of the study that it was going to be really difficult to identify which aspects of treatment had made a difference for the young people. Given that they are also meeting a clinician and... that they're in therapy” (ED-08).

However, there were clinicians who had not talked with YP about their use of the app or who had not engaged with the app:

“I don't know because I guess that would require sort of more active engagement with the content, which I didn't really have.” (ED-10)

5. Discussion

Drawing on NPT, the goal of the current study was to understand the perspectives of HCP regarding their roles in the i-Minds clinical trial, and the barriers and enablers relevant to future integration of the intervention into existing care pathways. As with other implementation studies, we found that the four NPT constructs allowed for a detailed analysis of the activities that took place across the sites (Ong et al., 2020; Richter et al., 2022). Twelve of the 54 HCP who referred to the i-Minds clinical feasibility trial were interviewed. Regarding Coherence, across both sites HCP were positive about the app and had a clear understanding of how i-Minds was different to their routine clinical practice in that the content specifically related to TASA, a topic that was rarely explored in therapy or the service setting more broadly, and which they felt was a growing problem for the YP that they work with. HCPs also saw how i-Minds was different to other apps they had encouraged YP to use; this related to the specificity of the content and the design of the app itself, which was viewed as engaging, rewarding and accessible. This awareness of the role that technology may play in sexual violence, and the perception by practitioners that they are ill-equipped to address it in their routine practice is seen across other studies (Quayle et al., 2023; Schmidt, Bucci, et al., 2023; Straw & Tanczer, 2023) and may point to the larger issue of a narrow understanding by mental health practitioners and researchers of the relationship between YP's technology use and mental health (Idelji-Tehrani et al., 2023).

However, while there was a positive response to i-Minds, some HCP felt excluded from the early stages of app development and collective specification and appraisal were variable, which seemed to reflect high workloads and low prioritisation of the value of an app by some teams. This occurred despite considerable efforts made by team leaders to prompt HCP to promote the study and the app to their clients. Other implementation studies have also demonstrated that infrastructure and technical issues, psychological barriers,

and workload-related concerns do impact on the adoption of HCPs (Borges do Nascimento et al., 2023). There were disparities in how teams shared information about the intervention which had, for some people, an impact on their confidence in recruiting YP to the study. Concerns were expressed about the app at team meetings in relation to how the clinical team might be supported to manage risk of harm. At an individual level, HCPs saw value in the app being used as a stand-alone intervention, especially when YP were on waiting lists, but anxieties remained about safety in relation to triggering distress or the device being used to access inappropriate online content. Some of these concerns related to the absence of feedback to HCPs about how the app was being used and that distress that might follow in relation to sexual content where there was no supportive therapeutic relationship. This raises issues about YP's access to the app and their ability to use this at a time that was best suited to them. Other DHI studies have noted that once an app has been installed on a hand-held device it can be activated in the background and used whenever and wherever YP feel the need to seek help (d'Halluin et al., 2023).

Different degrees of cognitive participation were demonstrated across sites, and this impacted on enrolment of YP to the study. HCPs seemed unsure about whether it was their role to ask YP to give feedback about the app with the result that in some cases there was clearly a lot of discussion about their use of i-Minds, whereas in others there was none at all, even though many of the YP recruited also had routine clinical appointments. Barriers to enrolment included staff workloads, lack of clarity about who the app was suitable for, and ongoing concerns about safety issues in the absence of direct therapeutic support. Safety remains an ongoing concern in relation to mobile mental health apps (e.g., (Koh et al., 2022) and it has been suggested that educators and practitioners need to be prepared for YP to do unexpected things, or use the application in ways that had not been predicted. A good example of this can be seen in relation to access to a sex education app where there were marked differences between what YP felt to be appropriate and acceptable and the views held by adult stakeholders (McKee et al., 2018). With i-Minds there were a very small number of cases where YP used the device supplied by the study to share sexual images of themselves and to contact individuals with whom they had an abusive relationship. This also raised important issues for HCPs about the timing of the intervention. For ethical reasons, the users of the app were already in existing mental health services and questions were raised as to whether i-Minds might have a better fit with early intervention models of care. This issue was also raised by YP who had used i-Minds (Quayle et al., 2024).

Collective Action evidenced that referring YP to the study did not increase workloads and importantly, i-Minds promoted changes in HCP work with YP, increasing the likelihood of asking about online sexual experiences. Paradoxically, there were concerns expressed that routinely asking YP about TASA would result in more YP being identified as needing therapeutic help. This raised issues about the need for additional staff and service support with technical issues related to the app. There were also comments about the need for ongoing education concerning YP and their use of technology, particularly in relation to rapid technological change.

Reflexive monitoring of the benefits and challenges of YP using i-Minds within services suggested that collective assessment of the value of the app was largely absent. Individual appraisal demonstrated that YP felt empowered and validated by the app and changed how they managed risks online. This is particularly important as, to date, there is limited evidence of behaviour change through online safety education (Finkelhor et al., 2021; Patterson et al., 2022) with some researchers concluding that online safety apps need to focus more on facilitating parent-teen communication to promote safety alongside balancing the needs of different stakeholders (Badillo-Urquiola et al., 2020). HCP felt confident in the app providing appropriate information and strategies, but again there were some concerns about HCP needing to provide technical support to YP using the app and anxieties that greater awareness of TASA may increase their overall workload.

The sample of HCP was relatively small and comprised largely White British women. This is notable in that within the TASA literature there is an over-representation of white children (and offenders) which may reflect different reporting practices across ethnic groups or different structural opportunities in both access to online resources or to therapy (Steinmetz et al., 2024). Only HCP who had referred into the trial were recruited; it is important to understand the barriers to recruitment across services and the implications that this might have for YP presenting to services, or during therapeutic engagement. However, participants did reflect that engagement with a DHI for TASA would be a gradual process of change and there was a clear understanding that YP's use of technology, and its impact on YP's mental health and well-being, is something HCP will need to confront. NPT offered a valuable set of conceptual tools to understand the implementation of i-Minds as a dynamic process (May et al., 2018) although our results resonate with those found using other DHI implementation frameworks such as RE-AIM (Raeside et al., 2024). Other studies that have examined HCP views of DHIs in specialist mental health services revealed the belief held by some HCP that more time should be spent on staff training rather than developing apps to support clients; money spent on developing digital tools appeared to challenge what was routinely delivered (Bucci et al., 2019). Within our sample, HCP questioned whether others would see i-Minds as relevant for their service or whether it would be sufficiently sensitive to the particular problems of this client group. There were also concerns by HCP that a DHI could not replace routine care and there were risks of potential distress or misuse in making it generally available. It may also have been the case that, for some HCPs, i-Minds is not a good fit with existing practice as TASA is not routinely explored within services or seen as an appropriate target for intervention (Schmidt, Bucci, et al., 2023), a finding also evidenced across other implementation studies (Fox et al., 2023). One scoping review identified key challenges to engagement of stakeholders with adolescent DTIs targeting prevention one of which was a disconnection between digital health and clinical preventive care, and this was certainly evidenced within our research findings where practitioners who had referred into the study showed little engagement with YP's use of the app (Wong et al., 2020). Similar to other studies we identified a perception by HCPs that digital technologies were impersonal tools that add to the burden of care for both providers and patients (Berardi et al., 2024) and that this occurs alongside system level factors which offer insufficient training or resources to make it possible for stakeholders to engage (Raeside et al., 2024). Across implementation studies there is often reference to the need to include all stakeholders in the design of the DHI and this is something that we played close attention to both in relation to HCPs and YP with lived experience of TASA. Going forward it would seem necessary to centre YP as experts with regard to their own online safety (Chatlani et al., 2023).

6. Conclusions

There are currently no evidence-based assessments or interventions for YP exposed to TASA, leaving clinicians reluctant to ask YP about such experiences. Policy makers can do more to acknowledge and prioritise the impact that technology has had on YP's lives, in both positive and negative ways. i-Minds was seen by HCP as a novel and important intervention for YP and resulted in some positive practice changes, but HCP concerns around potential risks and being a standalone treatment may be potential barriers to implementing a DHI like i-Minds into routine clinical practice. To date, risk to YP using mental health DHIs has largely been considered in relation to data security (Raftree, 2023) and the need to balance YP's freedom and agency with a genuine risk of harm (Livingstone et al., 2024). HCPs expressed legitimate concerns about i-Minds triggering traumatic memories for YP that would be both harmful and difficult to contain in a non-supported environment. It may have been helpful for HCPs to have been given use of the app (alongside the training offered by the study) to understand how two of the key topics covered by i-Minds were emotional and mental health and trauma with a focus on a compassionate and supportive approach to their experiences, the importance of which has been noted by other authors (van Lotringen et al., 2023). It is also the case for the app to be used more widely there also needs to be culturally sensitive solutions to TASA as i-Minds included reference to sexual content and activities that may be seen as problematic (Dolev-Cohen, 2023). Clinicians need further training and education to increase their confidence and skills in using digital technologies (and in TASA inquiry) as part of their practice and how these technologies can be used in early intervention.

CRedit authorship contribution statement

Ethel Quayle: Writing – review & editing, Writing – original draft, Supervision, Project administration, Funding acquisition, Formal analysis, Conceptualization. **Matthias Schwannauer:** Writing – review & editing, Supervision, Project administration, Conceptualization. **Filippo Varese:** Writing – review & editing, Supervision, Project administration, Funding acquisition, Conceptualization. **Kate Allsopp:** Writing – review & editing, Supervision, Methodology, Formal analysis. **Kim Cartwright:** Writing – review & editing, Funding acquisition. **Cindy Chan:** Writing – review & editing, Data curation. **Prathiba Chitsabesan:** Writing – review & editing, Funding acquisition. **Victoria Green:** Writing – review & editing, Funding acquisition. **William Hewins:** Writing – review & editing, Data curation. **Amanda Larkin:** Writing – review & editing, Supervision, Project administration, Methodology, Formal analysis. **Alice Newton:** Writing – review & editing, Data curation. **Erica Niebauer:** Writing – review & editing, Data curation. **Gillian Radford:** Writing – review & editing, Validation, Supervision. **Cathy Richards:** Writing – review & editing, Funding acquisition. **Marina Sandys:** Writing – review & editing, Data curation. **Sara Shafi:** Writing – review & editing, Validation, Supervision. **Jennifer Ward:** Writing – review & editing, Data curation. **Pauline Whelan:** Writing – review & editing, Funding acquisition. **Sandra Bucci:** Writing – review & editing, Supervision, Project administration, Methodology, Funding acquisition, Formal analysis, Conceptualization.

Data availability

The authors do not have permission to share data.

Acknowledgements

This study was funded by the National Institute for Health and Care Research Health Services and Delivery Research Programme (NIHR 131848). This study was supported by the NIHR Manchester Biomedical Research Centre (NIHR203308) and a NIHR Research Professorship (Bucci; NIHR 300794). The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care.

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