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CLINICAL RESEARCH ARTICLE

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Spring Military-PTSD: development and pilot evaluation of a guided digital therapy for military veterans with post-traumatic stress disorder (PTSD)

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ABSTRACT

Background: Cognitive behavioural therapy with a trauma focus (CBT-TF) is the gold-standard treatment for military post-traumatic stress disorder (PTSD), but access is limited by high costs, therapist shortages, and the demands of in-person delivery. Guided digital CBT-TF, delivered via an app or website with therapist support, offers a scalable alternative.

Objective: This study aimed to adapt *Spring PTSD*, an evidence-based guided digital therapy, for military veterans and conduct an initial pilot test of the adapted version.

Method: A two-stage process was used. In Stage 1, veterans with lived experience of PTSD (n = 11) participated in focus groups to guide adaptations. Key themes included the need for a relatable narrator, authentic military representation, diverse visuals, and military-inspired design. Veterans also emphasised addressing emotional regulation. These insights shaped the development of *Spring Military-PTSD*, which incorporated techniques from Enhanced Skills Training for Affective and Interpersonal Regulation (ESTAIR). In Stage 2, treatment-seeking veterans with PTSD (n = 10) took part in a pilot study that collected qualitative and quantitative data. The primary outcome was change in PTSD severity measured by the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5). Participants received an average of 3 h and 50 min of therapist support.

Results: Eight participants completed the pilot; two dropped out. Of the completers, four no longer met diagnostic criteria for PTSD, and six showed reliable improvement on CAPS-5. Statistically significant reductions were also seen in self-reported PTSD, disturbance in self-organisation (DSO), anxiety, and depression. Qualitative feedback supported the relevance and acceptability of the intervention.

Conclusions: Findings provide preliminary evidence for the efficacy and acceptability of *Spring Military-PTSD*. The adapted intervention shows promise as a scalable and engaging treatment for veterans with PTSD. Further research is warranted to evaluate its effectiveness and potential for broader implementation.

Spring TEPT-Militar: desarrollo y evaluación piloto de una terapia digital guiada para veteranos militares con trastorno de estrés postraumático (TEPT)

Antecedentes: La terapia cognitiva conductual con un foco en el trauma (CBT-TF en su sigla en inglés) es el tratamiento de excelencia para militares con trastorno de estrés postraumático (TEPT), pero el acceso es limitado por los costos altos, la escasez de terapeutas, y las demandas de la implementación en persona. La CBT-TF digital guiada, implementada por medio de una aplicación o página web con apoyo de terapeuta, ofrece una alternativa escalable.

Objetivo: Este estudio buscó adaptar el *Spring-TEPT*, una terapia digital guiada basada en la evidencia, para veteranos militares y realizar un estudio piloto inicial de la versión adaptada.

Método: Se utilizó un proceso de dos etapas. En la primera etapa, los veteranos con experiencia vivida de TEPT (n = 11) participaron en grupos focales para guiar adaptaciones. Los temas claves incluyeron la necesidad de un narrador cercano con el que se pudieran relacionar, una representación militar autentica, elementos visuales diversos, y un diseño inspirado en los servicios militares. Los veteranos enfatizaron el abordaje de la regulación emocional. Estas perspectivas moldearon el desarrollo del *Spring TEPT-Militar*, el cual incorporó técnicas del Entrenamiento de Habilidades Avanzadas para la Regulación Afectiva e Interpersonal (ESTAIR en sus siglas en inglés). En la segunda etapa, los veteranos con TEPT que buscaban tratamiento (n = 10) participaron en un estudio piloto que recolectó datos cuantitativos y cualitativos. El resultado primario fue el cambio en la severidad del TEPT medido por la Escala

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PALABRAS CLAVE

Militar; veteranos; CBT; digital; Internet; guiada; resorte; Entrenamiento de Habilidades Avanzadas para la Regulación Afectiva e Interpersonal (ESTAIR)

HIGHLIGHTS

- This study adapted *Spring PTSD*, an evidence-based guided digital therapy for post-traumatic stress disorder (PTSD), specifically for military veterans, creating the tailored version *Spring Military-PTSD*, which was pilot-tested.
- The pilot study demonstrated improvement in PTSD symptoms in all treatment completers (n = 8), with 75% (n = 6) achieving reliable symptom change on the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5), the primary outcome.
- The intervention provides a flexible, accessible alternative to traditional therapy, with potential for wide adoption in military mental health care.

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de TEPT Administrada por el Clínico para el DSM-5 (CAPS-5). Los participantes recibieron un promedio de 3 horas y 50 minutos de apoyo de terapeuta.
Resultados: Ocho participantes completaron el piloto; dos abandonaron el tratamiento. De quienes completaron el tratamiento, cuatro ya no cumplían con los criterios diagnósticos de TEPT, y seis mostraron mejorías confiables en la CAPS-5. También fueron observadas reducciones estadísticamente significativas en el TEPT autorreportado, perturbaciones en la autoorganización (DSO en su sigla en inglés), ansiedad, y depresión. La retroalimentación cualitativa apoyó la relevancia y la aceptabilidad de la intervención.
Conclusiones: Los hallazgos proporcionan evidencia preliminar para la eficacia y aceptabilidad del *Spring TEPT-Militar*. La versión adaptada se muestra prometedora como un tratamiento escalable y atractivo como tratamiento para veteranos con TEPT. Se requieren investigaciones futuras para evaluar la efectividad y su potencial implementación más amplia.

1. Introduction

Post-traumatic stress disorder (PTSD) is a significant mental health condition among active duty military personnel and veterans, with an estimated prevalence of approximately 6–7% in active service members, and notably higher rates observed among transitioned veterans (Müller et al., 2017; O'Toole & Catts, 2008; Stevelink et al., 2018). Veterans often present with complex symptoms and may not respond as well to standard evidence-based treatments as other populations (Kitchiner et al., 2019). Cognitive behavioural therapy with a trauma focus (CBT-TF) is the most well-supported treatment for military-related PTSD and the only treatment strongly recommended by the National Institute for Health and Care Excellence (NICE) (NICE, 2018).

A significant barrier to delivering CBT-TF is the high cost of in-person therapy, which often limits access to treatment (Wolitzky-Taylor et al., 2018). In addition, the shortage of trained therapists exacerbates accessibility issues and contributes to long waiting times (Hartnett, 2022). Moreover, the traditional treatment format, which requires weekly in-person sessions over an extended period, can be a challenging commitment for some veterans (Amsalem et al., 2022).

Delivering CBT-TF in a guided digital format offers a promising alternative. This approach delivers psychological therapy via an app or website with regular guidance from a psychological therapist. This guided digital format requires less therapist time than in-person delivery and allows veterans to engage in therapy at their convenience. In addition to reducing costs and enhancing accessibility, guided digital CBT-TF offers several other key benefits. It helps reduce stigma by providing a private and anonymous option for those hesitant to seek weekly in-person treatment. The self-paced nature of guided digital therapy enables users to progress at a speed that suits them, while continuous access to therapeutic content reinforces and strengthens new skills. Furthermore, the scalability of guided digital CBT-TF enables veterans in underserved or remote areas to access care, overcoming geographical barriers that may otherwise limit the availability of evidence-based treatment. While digital CBT-TF has demonstrated efficacy in treating PTSD (Lewis et al., 2019), it may not fully address other barriers experienced by veterans, such as treatment-related stigma, or the lack of content tailored to common military experiences. These limitations highlight the need for interventions that are not only accessible but also culturally and contextually relevant to this population.

Spring PTSD is an eight-step guided digital CBT-TF developed through extensive feasibility and efficacy work. Early development of *Spring PTSD* included pilot studies that produced promising results (Lewis et al., 2013), followed by a feasibility randomised controlled trial (RCT) that demonstrated its superiority compared to a waitlist (Lewis et al., 2017). Building on this foundation, the RAPID pragmatic, multicentre, non-inferiority RCT showed that *Spring PTSD* was equivalent to face-to-face CBT-TF in reducing clinician-rated PTSD symptoms at 16 weeks, with improvements maintained at the 52-week follow-up (Bisson et al., 2022). *Spring PTSD* was originally designed to treat PTSD following a single traumatic event and has been evaluated in individuals exposed to incidents such as road traffic accidents, traumatic childbirth, and witnessing sudden death. This said, participants in the RAPID trial reported a mean of 5.5 DSM-5 qualifying traumatic events, indicating the applicability of the intervention to individuals with multiple trauma exposures despite its original design. *Spring PTSD* follows the same principles as in-person CBT-TF but reduces therapist contact time by delivering key therapeutic components digitally. Treatment begins with a one-hour orientation session with a therapist, focused on building rapport, discussing trauma history, introducing the digital materials, and providing log-in details. Participants then work through the programme independently, supported by up to four fortnightly 30-minute sessions with a therapist, delivered in person, via video call, or telephone. At each session, the therapist monitors progress through a clinician dashboard, offering guidance, motivation, and problem-solving. Between

sessions, participants receive four brief check-in calls (via phone or video) or emails to review progress, address challenges, and establish new goals.

Spring PTSD is typically completed over eight weeks, with each step introducing key therapeutic components based on psychoeducation, grounding, relaxation, behavioural activation, imaginal exposure, cognitive restructuring, graded in-vivo exposure, and relapse prevention (Bisson et al., 2022; Lewis et al., 2017). Steps are usually followed in sequence, with later stages building on earlier skills. Although therapists help set goals, participants can move at their own pace. Each step activates tools within a toolkit, which also become visible to the therapist via a dashboard with the user's knowledge, allowing for tailored support. Following a successful feasibility randomised controlled trial (RCT) (Lewis et al., 2017), a large multi-site RCT across Wales, England, and Scotland demonstrated that *Spring PTSD* was non-inferior to individual face-to-face CBT-TF for PTSD related to a single traumatic event (Bisson et al., 2022). This led to its implementation within NHS Wales, including delivery to some military veterans with PTSD.

Recognising that PTSD can present differently in military veterans compared to civilians, this work aims to develop and pilot test a tailored version of *Spring PTSD* that retains its core effective components while addressing the specific challenges faced by veterans. Military veterans differ from civilian populations not only in experiencing a greater number of traumatic events, often prolonged, multiple and cumulative, but also in the nature of these traumas, which commonly involve combat, threat to life, and morally challenging situations. This contributes to more complex clinical presentations, including higher rates of disturbances in self-organisation (DSO) such as emotional dysregulation, negative self-concept, and interpersonal difficulties. DSO and other commonly encountered symptoms in military-related PTSD, such as anger, may not be fully addressed by generic PTSD interventions. These factors, alongside the distinct cultural and contextual experiences of military service, underscore the need for an intervention that is both trauma-focused and tailored specifically to the veteran population.

2. Study aim and design

The aim of this study was to develop an optimally configured guided digital CBT-TF based on *Spring PTSD* for military veterans and initially test it in an uncontrolled pilot study. A co-production approach was employed to ensure meaningful collaboration between researchers and stakeholders, with active participation from military veterans with lived experience of PTSD. The study followed a two-stage process. In the first stage, focus groups with military veterans informed the adaptation of *Spring PTSD* to better meet the needs of this population. In the second stage, a pilot study was conducted to initially evaluate the feasibility and acceptability of the adapted intervention and gather data to refine it further. The study design was guided by the Medical Research Council (MRC) framework for the development of complex interventions (Skivington et al., 2021), ensuring it was both evidence-informed and user-centred. An iterative approach was used throughout, incorporating ongoing feedback and stakeholder engagement. Wales Research Ethics Committee 1 granted a favourable ethical opinion for this work (IRAS project ID: 327070).

3. Stage 1: intervention adaptation

3.1. Method

3.1.1. Portfolio of information

Key background information about *Spring PTSD* was synthesised into a clear, accessible document summarising its content and delivery, illustrated with screenshots. The information was designed to be straightforward for stakeholders to review ahead of participation in a focus group to inform the adaptation of *Spring PTSD*, ensuring they were well-informed and prepared to contribute meaningfully. We also provided participants with a video demonstration of the civilian version of *Spring PTSD* to watch in advance.

3.1.2. Selection of focus group participants

Veterans with lived experience of PTSD were purposively sampled from several Veterans' organisations in Wales and England Participants were recruited through snowball sampling, with initial contacts suggesting additional avenues to identify participants with relevant lived experience. This recruitment strategy helped ensure that intervention adaptation was informed by a broad spectrum of experiences and knowledge.

Participants self-reported having lived experience of PTSD. A formal clinical diagnosis was not required for inclusion in the focus groups, as the purpose of this stage was not to evaluate treatment outcomes but to gather experiential input to inform adaptation of the intervention.

3.1.3. Eligibility criteria

Veterans of the U.K. Armed Forces aged 18 or older with lived experience of PTSD were included. The exclusion criterion was an inability to understand written or spoken English.

3.1.4. Co-production process

Stakeholders participated in online focus groups, which followed a semi-structured format to encourage

open discussion on usability, content, accessibility, and user engagement. Eleven veterans with lived experience of PTSD took part in one of two stakeholder focus groups conducted between on the 7th and 15th August 2023 with durations of approximately 90 and 120 min. The sample included eight males and three females, aged 30–79. Service arms included the Army ($n = 7$), Royal Marines ($n = 1$), RAF ($n = 3$), and Royal Navy ($n = 2$). All were White British. Participant characteristics are detailed in the supplementary materials. Sessions were audio-recorded with consent and transcribed for qualitative analysis. A pre-defined topic guide steered discussions. Participants were compensated £25 per hour for their time.

3.1.5. Data analysis

We conducted inductive thematic analysis of the stakeholder groups following the six-phase approach outlined by Braun and Clarke (Clarke & Braun, 2017) using NVivo12 (QSR, 2020). The analysis was data-driven, allowing themes to emerge from the data rather than being shaped by a pre-existing framework. The process involved the following steps:

1. Familiarisation with the data: All transcripts were read multiple times to ensure immersion, and initial notes were made to capture early impressions.
2. Generating initial codes: Data were systematically coded for features relevant to the adaptation of *Spring PTSD*, using an open-coding approach.
3. Searching for themes: Codes were examined for patterns, and potential themes were identified based on their prevalence and significance.
4. Reviewing themes: Themes were refined by checking coherence within themes and distinctiveness between themes, ensuring they accurately represented the dataset.
5. Defining and naming themes: Each theme was clearly defined, and thematic maps were developed to illustrate relationships between themes.
6. Writing the report: Themes were supported with illustrative data extracts to ensure transparency and credibility.

To enhance the reliability of coding, the data were independently double coded by Research Assistant BT and JWSY, an undergraduate psychology placement student. Discrepancies were discussed and resolved through consensus. To ensure rigour and reflexivity in the analysis, emerging themes were regularly discussed within the research team. These discussions provided an opportunity to challenge assumptions, explore alternative interpretations, and refine theme definitions. Through this iterative process, we sought to enhance the credibility of our findings by incorporating multiple perspectives and ensuring the themes remained grounded in the data. Additionally, these discussions helped to identify potential researcher biases and maintain analytical transparency throughout the study.

3.1.6. Using qualitative findings to guide intervention adaptation

The qualitative findings informed the development of an initial outline of *Spring Military-PTSD*. This outline was shared with participants for feedback, ensuring their perspectives were integrated into the final design. The refined outline then guided the creation of detailed storyboards. The content was carefully reviewed to ensure it met the broad and varied needs of military veterans with PTSD. Key considerations, such as creating user-friendly interfaces and ensuring accessibility for individuals with different levels of digital literacy, were addressed based on stakeholder input. This process led to the development of *Spring Military-PTSD*, ready for pilot testing.

4. Results

4.1. Stage 1: intervention adaptation

4.1.1. Participants

Key qualitative themes emerged, informing the adaptation of *Spring PTSD* for military veterans. Participants preferred a relatable narrator with a regional accent, authentic military representation in characters, and diverse visual imagery with military-inspired colours. They also highlighted the need for content addressing veterans' unique challenges, such as hypervigilance, emotional regulation, and anger management, along with optional resources for families and friends. A summary of the qualitative findings is provided in Table 1.

4.1.1.1. Spring Military-PTSD. Spring Military-PTSD was developed from the stage 1 qualitative findings as a ten-step guided digital therapy based on CBT-TF, delivered over 10 weeks. It includes seven steps derived from *Spring PTSD* (Learning about PTSD, Grounding and Relaxation, Reconnecting with Life, Telling Your Story, Challenging Unhelpful Thinking, Overcoming Avoidance, and Looking Ahead), plus three steps from Enhanced Skills Training for Affective and Interpersonal Regulation (ESTAIR) (Karatzias et al., 2023) to target DSO symptoms in complex PTSD: Exploring Emotions, Understanding Yourself, and Navigating Relationships (Figure 1).

4.1.1.2. Features. *Spring Military-PTSD* incorporates several key features to enhance engagement. The programme includes interactive content, where each step

Table 1. Summary of qualitative findings from stage 1 (intervention development).

Theme	What participants said	Quote	How this shaped *Spring Military-PTSD*
Preference for a relatable narrator	Participants highlighted the importance of having a relatable narrator, expressing a clear preference for regional accents. These accents were seen as more authentic and engaging. In contrast, neutral or 'posh' accents, which were perceived as distant or indicative of a class divide.	'I'd rather have somebody who's got a bit of an accent … I've got no preference whether it's a woman or not, but for me some of them were just too posh … They're gonna want somebody they can sit down in a pub and talk to or in a cafe, do you know what I mean? Somebody that sounds like them.' – Sarah	*Spring Military-PTSD* is narrated with a regional accent to maximise relatability. Care was taken to avoid an overly formal or detached voice, and input from veterans was used to select from a range of options that aligned with the preferences and criteria established in the focus groups.
Authentic military representation in characters	Participants stressed the importance of authentic military representation in characters, expressing a strong preference for real veterans over actors to enhance relatability and credibility. They highlighted the diverse nature of military trauma, emphasising the need to acknowledge varied experiences, including those of combat medics, women who have faced harassment, and LGBT veterans.	'You need to have an empathy with the people who are actually talking. You know, not clearly actors saying something from a script.' – William	Due to ethical and practical constraints, we opted not to include real-life veterans directly sharing their own stories. Instead, we identified actors who were veterans, and they delivered fictional narratives based on real experiences. To ensure authenticity, veterans played a key role in shaping these stories, and the characters were designed to reflect a broad range of military backgrounds.
Military inspired colour scheme	Participants emphasised the importance of using military colours, such as army green, air force blue, and navy blue, to create a connection to the services. These colours were generally preferred, though some participants suggested a brighter or more neutral palette for accessibility and inclusivity. Light colours, particularly white and light green, were desirable to help with readability.	'[So] you can see straight away … whoever designed this is thinking that's how the military like it – they love the Army green, the Air Force blue, or the Naval blue.' – David	The colour scheme incorporates military colours to make the design more relatable for veterans, ensuring it feels tailored and engaging. Light uncluttered backgrounds and brighter accents were added to enhance visual clarity, readability, and accessibility.
Accurate and diverse visual imagery	Participants valued diverse representation in the images used within the programme, advocating a broad spectrum of ethnicities, genders, and service roles. They suggested depicting a transition from military to civilian life to reflect veterans' journeys. There was also a strong preference for including underrepresented groups, such as women, LGBT veterans, and individuals with disabilities, while ensuring military uniforms and equipment were portrayed correctly. The use of stylised, cartoon-like images was welcomed to keep the visuals engaging and avoid the complexities of real-life photography.	'The characters, like you know, you've got a different mix of ages, genders sort of think those are like an animated character was a wheelchair user. You've got people obviously who we've got a Welsh accent and I don't know whether there's any. Ethnic minority actors or actresses in that but didn't clock it all at once and so I think the diversity representation is good. I can't really think how you can improve it.' – Rhiannon	The programme features a diverse range of illustrated characters, representing different service backgrounds, life experiences, and post-military transitions. Care was taken to ensure uniforms and equipment were depicted correctly.
Customising content to meet veterans' unique needs	Participants expressed a strong desire for content that addresses the specific challenges veterans face, such as the impact of military training on mental health. They recommended adding information on topics like hypervigilance, anger management, and the effects of military acculturation.	'Military training is designed to take that flight part away from your brain. You know, we work on it. And then, you know, there's absolutely nothing that puts it back in for your transition into civilian life in a lot of areas.' – Charlie	*Spring Military-PTSD* was tailored to address the unique challenges veterans face, particularly in managing hypervigilance, anger, and the complexities of transitioning into civilian life. The content also focuses on characteristic features of complex PTSD, with steps designed to support emotional regulation, healthy relationships, and self-image.
Provision of information for family and friends	The provision of information for family and friends was strongly advocated. Some participants suggested the inclusion of sessions for family members or friends. However, it was also emphasised that some veterans may not have anyone to involve. The provision of written information for family and friends was supported, with support for empathic wording and the inclusion of resources for family members' own mental health needs.	'Yeah, maybe there's something whereby there's like an optional session for the fam, like the loved ones, family, whatever one I call the people around you … If they want some more information about the condition. Rather than like mandatory … a little introductory session about what is PTSD. These are things to look out for. These are sort of things that you might want to do to encourage them if you feel able to or discourage them from doing like that last little checklist.' – Sarah	We created a comprehensive information leaflet on military PTSD, offering veterans the option to share it with their families if they wished.
Fortnightly guidance sessions	Most participants felt that the fortnightly guidance sessions used in the civilian version of *Spring PTSD* would be appropriate for veterans using *Spring Military-PTSD*. However, some participants noted that the frequency of sessions might need to be tailored to individual needs and the severity of symptoms.	'I don't think you wanted to be doing it too often. Fortnights fine, I would say. But then everybody's individual, so you would have to take that on merit … ' – *Huw*	Fortnightly guidance sessions were retained as standard. Given the difficulty in incorporating flexibility while adhering to a standard protocol for delivery in a trial, we opted not to incorporate flexibility at this stage but to collect feedback during the pilot study to assess whether adjustments were needed.

Figure 1. Spring military PTSD outline.

is guided by audio narration, with key information and visuals displayed on screen. User input shapes the feedback they receive to create a personalised experience. Character case studies feature four actors portraying veterans' experiences, offering relatable examples. A toolkit provides access to essential therapeutic techniques, such as fear-ladders and trauma narratives. A clinician dashboard enables therapists to monitor participant progress in real time and adjust support as needed. Additionally, an information leaflet for family and friends helps with understanding military PTSD and therapy with *Spring Military-PTSD*. Therapist guidance includes an initial one-hour meeting to establish rapport, discuss trauma histories, and introduce the programme. This is followed by five 30-minute guidance sessions delivered every other week, along with five brief check-ins to track progress. A therapist manual ensures standardised delivery of the intervention. The programme is designed for accessibility on PCs, laptops, tablets, and smartphones. Figure 2 presents a screenshot.

4.2. Stage 2: pilot study

4.2.1. Method

The pilot study aimed to gather feedback from treatment-seeking veterans with PTSD to refine the intervention and assess its feasibility and acceptability.

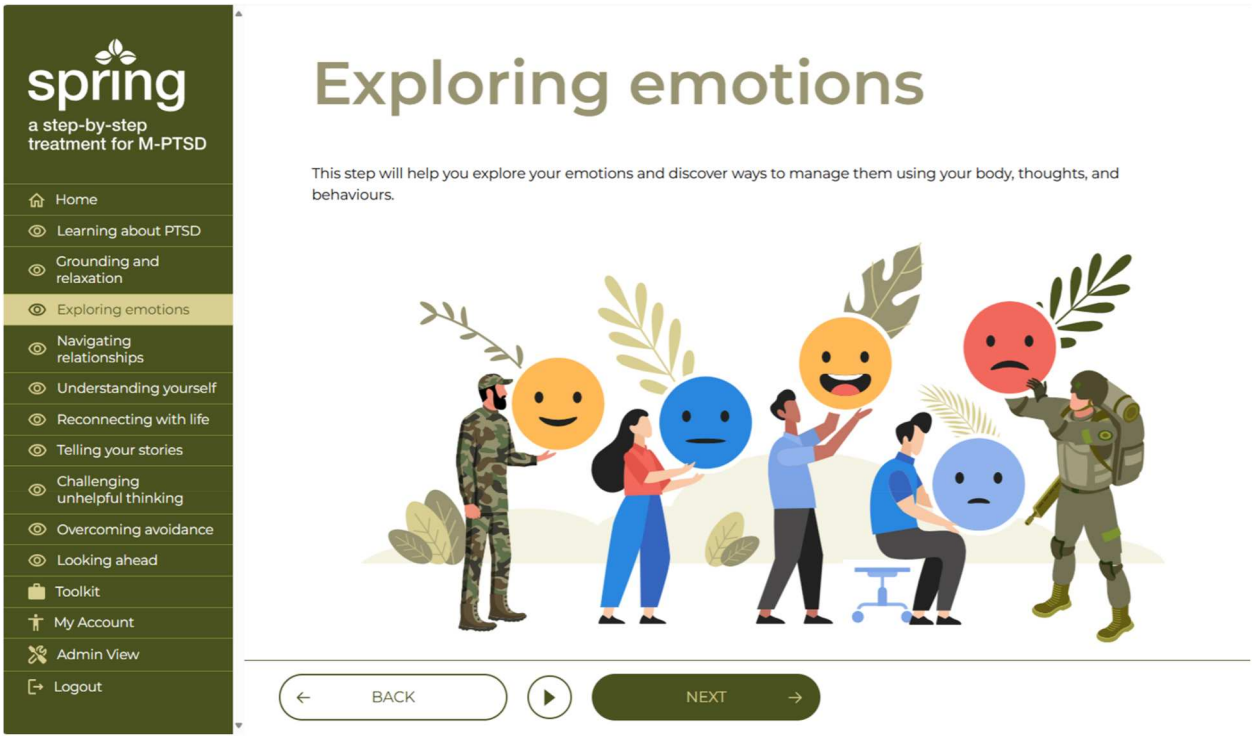

Figure 2. Screenshot or spring military PTSD.

4.2.2. Selection of pilot study participants

We initially evaluated *Spring Military-PTSD* with a purposively selected sample of ten veterans from Veterans' NHS Wales (veteranswales.co.uk), a specialised priority service for individuals experiencing mental health difficulties specifically related to having served in the U.K. Armed Forces.

4.2.3. Eligibility criteria

Participants were purposively selected based on the inclusion criteria, including being aged 18 or over, meeting diagnostic criteria for DSM-5 PTSD according to the Clinician Administered PTSD Scale for DSM-5 (CAPS-5), and being veterans of the U.K. Armed Forces with regular internet access. Exclusion criteria included difficulties understanding English, being engaged in current psychological therapy, recent changes in medication, psychosis, substance dependence, and active suicide risk.

4.2.4. Participant identification and consent

Veterans seeking treatment from Veterans' NHS Wales were referred to the research team by clinicians. Eligible participants received study information and provided remote consent after having the opportunity to ask questions. The researcher read each consent statement aloud, recorded responses on an encrypted device, and completed an electronic consent form. A transcribed record was securely stored, and participants received a copy of the consent form via email.

4.2.5. Data collection

Following informed consent, participants completed pre-treatment assessments and participated in qualitative interviews to discuss their expectations of *Spring Military-PTSD*. After treatment, participants completed follow-up assessments of their symptoms and took part in interviews to share their experiences and provide suggestions for improvement. A £25 voucher was provided as a token of appreciation for their participation in the interviews. In addition to interviewing participants, we also conducted interviews with all study therapists before and after they delivered the intervention to gain insights into their experiences.

4.2.6. Outcome measures

4.2.6.1. Primary outcome. The CAPS-5 was the primary outcome measure (Weathers et al., 2018) and it was administered pre and post treatment. The CAPS-5 is a 29-item structured interview assessing PTSD diagnostic status and symptom severity, considered the gold standard in PTSD assessment. It demonstrates excellent reliability, convergent and discriminant validity, diagnostic utility, and sensitivity to clinical change (Weathers et al., 2018; Wojujutari et al., 2024). Lifetime exposure to potentially traumatic events was assessed with the Life Events Checklist for DSM-5 (LEC-5) (Weathers et al., 2013).

4.2.6.2. Secondary outcomes. The secondary outcomes were as follows:

International Trauma Questionnaire (ITQ): An 18-item scale assessing symptoms of PTSD and complex

PTSD according to ICD-11 criteria (Cloitre et al., 2018).

Generalised Anxiety Disorder 7 (GAD-7): A brief, well-validated self-report measure of anxiety symptoms (Spitzer et al., 2006).

Patient Health Questionnaire 9 (PHQ-9): A brief, well-validated self-report measure of symptoms of depression (Kroenke et al., 2001).

Insomnia Severity Index (ISI): A seven-item self-report questionnaire measuring the severity and impact of insomnia (Morin et al., 2011).

Goal-Based Outcomes (GBOs): A measure of progress towards self-identified personal goals (Law & Jacob, 2013). Progress was assessed on a scale from 0 (not met) to 10 (fully achieved). The difference in GBO scores between pre and post treatment was calculated to evaluate overall goal progress.

Work and Social Adjustment Scale (WSAS): A self-report measure assessing the impact of mental health difficulties on daily functioning (Zahra et al., 2014).

AUDIT: A 10-question tool assessing alcohol consumption and alcohol-related problems over the past three months (Saunders et al., 1993).

EQ5D-5L: A widely used instrument for assessing health-related quality of life (Herdman et al., 2011).

4.2.7. Therapists

The intervention was delivered by experienced Veterans' NHS Wales therapists. All had prior experience providing CBT-TF for PTSD. Training began with an introduction to the programme, its underlying rationale, and a demonstration by the trainer (NK). Therapists then worked through the delivery manual alongside the trainer, focusing on effectively guiding veterans with PTSD through each step of the programme. Following the initial training, therapists participated in role-playing exercises, alternating between the roles of clinician and patient to enhance their understanding of both the therapeutic process and the user experience. They were only assigned pilot study participants once they had demonstrated sufficient competence, at which point the trainer became their clinical supervisor for the duration of the trial.

4.2.8. Data analysis

4.2.8.1. Qualitative. Inductive thematic analysis was performed using NVivo12 (QSR, 2020), following the same approach as in stage 1 (intervention adaptation).

4.2.8.2. Quantitative analysis. Quantitative analyses were conducted using Stata 18 (StataCorp, 2023) to assess changes in PTSD symptom severity and other mental health outcomes. The primary analysis examined changes in CAPS-5 scores. The Reliable Change Index (RCI) was used to determine whether individual symptom reductions exceeded measurement error, with values ≤ -1.96 indicating statistically reliable improvement (Jacobson & Truax, 1992). A paired sample t-test was performed to assess mean differences in pre and post treatment CAPS-5 scores. Secondary analyses examined changes in additional outcome measurements using paired sample t-tests. These included the ITQ subscales for PTSD and DSO symptoms (Cloitre et al., 2018), as well as measures of anxiety (GAD-7) (Spitzer et al., 2006), depression (PHQ-9) (Kroenke et al., 2001), insomnia (ISI) (Morin et al., 2011), goal-based outcomes (Law & Jacob, 2013), functional impairment (WSAS) (Zahra et al., 2014), global health (EQ-5D) (Herdman et al., 2011), and alcohol use (AUDIT) (Saunders et al., 1993). Analyses were conducted using both the completer sample and an intention-to-treat (ITT) sample, with missing data addressed using the Last Observation Carried Forward (LOCF) method. Statistical significance was set at $p < .05$.

4.3. Results

4.3.1. Participants

Spring Military-PTSD was pilot tested with a total of ten participants between August 2024 and March 2025. The sample included nine male and one female participants, all identifying as White British. Participants ranged in age from 35 to 59 years. Educational backgrounds varied, with most having graduated from high school or holding higher-level qualifications, while one participant reported having no formal qualifications. The majority were employed, though one participant was unable to work. Most had prior experience with talking therapies, including counselling and EMDR, with the time since last therapy ranging from less than a year to over 20 years. Several participants were currently taking medication, primarily for clinician diagnosed PTSD, CPTSD, anxiety, or depression. All had served in the military, with representation from both regular and reservist forces across the Army and Royal Navy. Time since discharge varied widely, from one to 32 years, and participants had served between four and 35 years, with deployment histories ranging from no tours to seven.

All participants met criteria for DSM-5 PTSD according to the CAPS-5 and all met probable diagnostic criteria for CPTSD according to the ITQ. Participants reported a total of 63 traumatic events, averaging 6.3 events per person, as captured by the LEC-5. A variety of traumatic experiences were reported, with the most common being fire or explosion ($n = 9$) (14%), followed by combat or exposure to a war-zone ($n = 7$) (11%), serious injury, harm, or death you caused to someone else ($n = 6$) (10%), other very stressful event ($n = 6$) (10%), Assault with a weapon ($n = 5$) (8%), and sudden violent death

($n = 5$) (8%). The primary military traumas for which participants were seeking treatment were witnessing sudden violent deaths and their aftermath ($n = 3$) (30%), coming under fire and being severely injured ($n = 2$) (20%), sexual assault ($n = 2$) (20%), getting trapped in a training exercise ($n = 1$) (10%), witnessing human suffering ($n = 1$) (10%), and a transportation accident during combat ($n = 1$) (10%) (Table 2).

4.4. Qualitative results

4.4.1. Pre-treatment participant and therapist perspectives

Table 3 summarises key themes from pre-treatment interviews with both participants and therapists. Participants expressed some initial concerns about therapy readiness, the digital format, and potential stigma, but also highlighted optimism about the flexibility and potential benefits of guided digital therapy. Therapists shared concerns regarding client engagement and effectiveness for complex PTSD but were generally optimistic about resource efficiency and the potential of a military-specific version of the intervention.

4.4.2. Post-treatment participant and therapist perspectives

Table 3 presents a summary of participant feedback from post-treatment interviews, highlighting key themes and sub-themes related to their experiences of receiving therapy with *Spring Military-PTSD*. Overall, participants expressed high satisfaction with the intervention, particularly valuing the flexibility, accessibility, and therapeutic techniques it offered. While the programme was generally well-received, participants noted challenges such as technical issues and the emotional impact of certain content. Some participants suggested improvements, including additional features like the ability to upload handwritten notes, skip content, and access downloadable resources. The feedback also underscores the importance of therapist support and personal motivation in maintaining engagement.

Post-treatment therapist perspectives on *Spring Military-PTSD* revealed generally positive reflections, noting user-friendliness and suitability for self-motivated participants. Therapists found the programme beneficial in alleviating therapist workload, though it was not generally viewed as a full substitute for intensive in-person therapy. However, recruitment challenges arose, with limited therapist availability and participant readiness cited as barriers. Therapists also enjoyed the flexibility of alternating between face-to-face and online sessions, which helped maintain variety in their daily practice. Despite this, stress was noted when participants missed sessions or struggled with engagement, impacting the overall

Table 2. Participant characteristics – stage 2 (pilot study).

	Age	Gender	Highest Level of Qualification	Employment Status	Previous Talking Therapy	Time Since Talking Therapy	Current Medication	Service	Type of Service	Time Since Discharge (Years)	Length of Service (Years)	Number of Deployments
1	50	Male	Upper secondary school completion or higher	Employed	Counselling	10–20 years	None	Army	Regular	9	22	5
2	59	Male	Upper secondary school completion or higher	Employed	Counselling	5–10 years	For anxiety	Army	Reservist	22	5	0
3	53	Male	Lower secondary school completion	Employed	Counselling	5–10 years	For PTSD/CPTSD	Army	Regular	31	6	2
4	56	Male	Upper secondary school completion or higher	Employed	–	–	For PTSD/CPTSD	Army	Regular	32	7	3
5	35	Male	Lower secondary school completion	Employed	–	–	For low mood/ depression	Army	Regular	8	7	1
6	46	Male	Upper secondary school completion or higher	Unable to work	–	–	Prefer not to say	Royal Navy	Regular	20	4	5
7	59	Male	Degree level or above	Employed	–	–	For PTSD/CPTSD	Army	Reservist	1	35	5
8	45	Male	Degree level or above	Employed	EMDR	1–5 years	For PTSD/CPTSD	Army	Regular	9	20	7
9	36	Male	No qualifications	Employed	–	–	None	Army	Regular	14	8	2
10	45	Female	Degree level or above	Self-employed or freelance	EMDR	6–12 months	For PTSD/CPTSD	Army	Regular	20	8.5	2

Table 3. Qualitative results of pre and post treatment interviews with pilot study participants and therapists.

Pre-treatment Participant Perspectives		
Theme	Sub-theme	Participant Quote
Initial concerns and readiness for therapy	**Concerns about readiness for therapy:** Participants expressed apprehension about starting therapy, fearing it could worsen their symptoms or trigger emotional distress.	'So I am a little bit concerned, like, "Oh my gosh, is it going to rip the lid off again?"' – Participant 6
	Concerns about motivation and concentration: Participants worried about staying focused and motivated, drawing on past online learning experiences.	'So, I done that course once – a mental health first aid course online, and truthfully … I just didn't get anything from it. I ran away from that, and I was like this online stuff didn't really do it for me … ' – Participant 7
	Concerns about the guided digital format: The format raised concerns, particularly about feeling unsupported at difficult points in therapy.	'I suppose the only concern I have is if it's something that totally stresses me out. What do I do, you know?' – Participant 6
	Fear of judgement: One participant expressed concern about stigma and being judged for seeking therapy.	'What were you thinking? Why are you telling people all this? What is wrong with you? It's painful and embarrassing.' – Participant 10
	Concerns about usability: A participant with ADHD raised concerns about the lack of customisation options in the digital materials, especially regarding colour schemes.	'Being able to change it to a more neutral colour rather than black and white would just be more calming.' – Participant 10
Positive outlook on guided digital therapy	**Hope for positive outcomes:** Despite some uncertainty, participants were optimistic about the potential benefits of guided digital therapy, believing it would improve their wellbeing.	'I'm hoping I'll learn something from it, and I hope others will too. I think it's a good thing for everyone.' – Participant 2
	Preference for digital delivery: Several participants noted they felt more at ease engaging in therapy online, finding it easier to express themselves than in face-to-face interactions. Participants valued the flexibility of 24/7 access to the digital materials, expecting it to be an advantage compared to traditional therapy.	'I find it a lot easier to talk to someone online than face to face. For me, it's better this way.' – Participant 5
Anticipated effectiveness of guided digital therapy	**Expectations of effectiveness:** Some participants believed that guided digital therapy could be more effective than traditional therapy, offering flexibility and ability to work at their own pace.	'It's probably going to be more effective because you can re-access your notes and self-directed learning at any time, whereas you can't always speak to someone face-to-face right away.' – Participant 4
	Uncertainty about effectiveness: A few participants were uncertain about the potential effectiveness of the guided digital therapy since they had no prior experience with this approach.	'I don't know what to expect because I've never done anything like this before.' – Participant 5
Feedback on the participant information sheet	**Clarity and accessibility:** Most participants found the information sheet to be comprehensive, clear, straightforward, and free of confusing jargon. Suggestions for improvement included visual aids such as timelines or screenshots.	'I think it covered all the main questions I had, so I didn't need to ask more.' – Participant 5
	Desire for more detailed information: Some participants expressed the need for more detailed information on what would be expected of them in the study and the overall process.	'I don't fully understand what's going to happen. Maybe explaining more about the study itself would be helpful.' – Participant 2
Pre-treatment Therapist Perspectives		
Theme	Sub-theme	Participant Quote
Optimism and expected benefits	**Excitement about a military-specific version of Spring PTSD**: Therapists who had experience with the civilian version of *Spring PTSD* were eager to see how a military adaptation would address the more complex PTSD presentations in veterans. Therapists believed a tailored military version of *Spring PTSD* would be more engaging and relatable for veterans.	'Veterans using the civilian version never fully bought into it. A military version will be more relatable.' – Therapist 1
	Potential to reduce waiting lists: Some therapists believed that integrating guided digital therapy into their practice could help ease pressure on waiting lists by providing an additional therapeutic option.	'It's quite nice to have some guided self-help amongst the 90-minute sessions. It provides variation and might help pick up cases, potentially easing the waiting list.' – Therapist 7
	Resource efficiency: Therapists noted that guided digital therapy could help reduce waiting lists, free up physical space, and make therapy more accessible.	'If a client agrees to it, that creates space for another client. So it definitely helps.' – Therapist 3
Initial Concerns	**Concerns about therapist motivation:** Some therapists were concerned that guided digital therapy might be chosen by staff who were less motivated or committed.	'I sometimes have a thought that the online option can be taken by staff who are not particularly well motivated or a bit work-shy … might be the easy option for those who are less than committed.' – Therapist 5
	Concerns about client engagement: There were worries that clients might not fully engage with the guided digital therapy, requiring therapists to spend additional time encouraging participation.	'I'll be chasing clients to do the stuff that they won't be doing. I might take responsibility for that, see it as a problem where I'm lacking.' – Therapist 6
	Appropriateness for veterans: Therapists questioned whether guided digital therapy would adequately address the needs of veterans, particularly those with complex PTSD.	'Finding the right veteran who will be on board with it could be tricky.' – Therapist 3
Effectiveness of Guided Digital Therapy	**Risk of additional needs and re-referrals:** Some therapists expressed concerns that clients might return for additional support if the digital intervention was not sufficient,	'If we're having people who make a full recovery referred back in, it could be a two-edged sword.' – Therapist 5

(*Continued*)

Table 3. Continued.

Pre-treatment Therapist Perspectives		
Theme	Sub-theme	Participant Quote
	potentially increasing workload in the long run. There were reservations about whether the intervention would provide a sufficient 'dose' of therapy, especially for clients who might ultimately require face-to-face sessions.	
	Potential for equal or greater effectiveness: Others believed that for the right clients, digital therapy could be as effective or even more effective than traditional therapy, as it allows clients to revisit materials at their own pace.	'With the right client, it could be more effective. If they embrace it, they could respond really well.' – Therapist 3
Therapist Experience and Training	**Previous experience** Therapists had varied experience with guided digital therapy, with some having used it extensively, while others were new to the format.	'I've been working in private as well as NHS, so digital therapy is standard since COVID.' – Therapist 4
	Training experience Therapists generally found the training comprehensive, though some suggested improvements in how content was delivered.	'Talking through the overview is effective, but playing all the audio from the website makes it harder to absorb.' – Therapist 2
Post-treatment Participant Perspectives		
Theme	Sub-theme	Quotes
Acceptability	**Overall satisfaction:** Participants were highly satisfied with *Spring Military PTSD*, noting that it was well-structured, effective, and exceeded their expectations. They appreciated how it helped them function better in daily life.	'It was one that that sticks in your mind and it's thought provoking. It's something that makes you think and makes you work through your traumas … And I thought this would just be another [online course], but it's not. It was completely different. There's a lot of things there that really help.' – Participant 2
	Recommendation to others: Every participant who completed treatment said they would recommend it to others. They highlighted the flexibility of the approach and the benefits they had gained. One participant specifically noted that the digital format made it an ideal choice for individuals who might feel hesitant to pursue traditional therapy.	'I already have [recommended it]. 'Cause I got friends from Northern Ireland Who are suffering symptoms of PTSD and I've already said that I've done this I've done this research … I said if you need anything, you know what I mean? This is the e-mail address [to contact].' – Participant 3
	Depth and lasting impact: Many participants were surprised by the depth and effectiveness of the programme. It was described as 'intense in a good way,' 'thought-provoking,' and something that 'sticks with you.'	'It was one that sticks in your mind and it's thought provoking. It's something that makes you think and makes you work through your traumas.' – Participant 2
	Practical and relatable techniques: The relaxation and grounding techniques were a favourite among participants. Personal stories helped them feel less alone. Seeing characters share their experiences helped validate their own feelings and emotions.	'I enjoyed the breathing techniques. That was good. The writing down of the different things. Brilliant.' – Participant 2
Accessibility, Flexibility, and User Experience	**Convenience and accessibility:** Participants appreciated being able to access the digital materials at any time on their phone or computer, making it easy to integrate into daily life. Participants preferred accessing materials online to travelling and parking at hospitals. However, some participants found the less structured approach led to procrastination.	'It's on my phone, so it's always with me and every so often I dip in and I dip out of it just to have a have a read.' – Participant 3
	Self-pacing and flexibility: The ability to set their own pace and revisit materials was highly valued. There were no time constraints, allowing participants to engage with the programme whenever it suited them. Therapy could be scheduled around work, with some doing sessions during breaks or while on call. However, some struggled with balancing therapy and their job, especially when employers failed to recognise it as a valid reason for time off.	'It's everything that you can take as much time to do things as you want, then revisit it an hour later. Or you can put an hour aside beginning or end of the day, and I think having that flexibility was really useful.' – Participant 4
	Ease of use: The programme was described as easy to navigate, simple to use, and intuitive, even for those with limited technical skills. The presentation of information in different formats (video, writing, and audio), helped accommodate different learning styles	'No, it was really straightforward. Like I said, I'm not an IT minded person and I found it very, very straightforward. So somebody with limited IT skills would equally find it easy I think.' – Participant 4
	Clear layout and logical content flow: Participants appreciated the clear design and well-organised layout, which allowed them to track their progress and revisit content. The flow of content made sense and was easy to follow and understand.	'I'd like to say that I just found the way it flowed chronologically through descriptions of what it is, what the symptoms are, how it affects people's lives. I just found it flowed really, really well.' – Participant 4
	Technical issues: Some participants experienced issues with the app not saving data, losing work when transitioning screens, or requiring them to restart steps.	'I spent three hours on it, and everything I wrote down … went. Work was lost.' – Participant 8
	Device preferences: Many participants used the app on their phones for convenience and accessibility, but laptops were preferred for ease of use. One participant commented on scaling issues on smaller devices.	'I'm going to finish off and do the last ones on my laptop. So it was definitely better on the laptop than it was on an iPad or an iPhone.' – Participant 8
Programme Content and Structure	**Desire for a broader focus:** Some felt the programme focused too much on military trauma and suggested it should be more inclusive of other traumatic life events that veterans often experience. More flexibility in pacing was suggested for those dealing with multiple traumas. One participant suggested a 'graduation pack' that could help	'I'm just saying that personally, my personal experiences, most of them were not in the military. So it's a lot of issues that I've not addressed. Which now [therapist]'s going to address in the new year … So it'll be addressed, but not by the study.' – Participant 2

(*Continued*)

Table 3. Continued.

Post-treatment Participant Perspectives		
Theme	Sub-theme	Quotes
	individuals continue their journey beyond the structured 10 weeks.	
	Mixed opinions on video case studies: Some participants found the video case studies relatable, helping them feel validated and less isolated. However, some felt the characters lacked authenticity due to oversimplified stories and clear use of actors. They suggested incorporating more complex case studies and showing characters using coping strategies.	'Even though they were telling their stories, it would have been really nice to see them using the tools and saying how the tools help them and when they use them and what they found useful and maybe.' – Participant 9
	Programme pace and time constraints: Some participants felt the 10-week programme was too fast, making it difficult to process emotions. A few also mentioned the desire to talk at length in sessions but worried about taking up too much time.	'I felt it was Slightly rushed, it felt like it felt like you'd you'd start one section and it was like not pressured, but I felt like I didn't have time to sort of just focus on that … ' – Participant 9
	Therapist support and accountability: The support and guidance provided by the therapist played a crucial role in keeping participants motivated and engaged. Participants valued having someone to check in with regularly for encouragement and advice.	'Brilliant. As I say, it was just that if I was stuck, if there was any issues, I knew they had somebody to go to talk to, I could ring him. I could e-mail him … It was good and [therapist] was there every step of the way, you know? So it was. It was great.' – Participant 2
	Desire for additional functionality: Participants suggested improvements to enhance engagement and usability. Requests included the ability to upload handwritten notes or audio recordings for tasks, more free-text sections for reflection, and downloadable relaxation exercises. The inability to fast-forward or skip content was a challenge, especially when certain content triggered painful memories. Having more control over navigation and content interaction would improve the experience.	'Like I said, if you go through one of these stories, you listen to one of these stories and then they take you back and to the back to where you were before, if you had to listen to that story again, then there was no way you have, like fast forwarding it. If you press next, you jump to the next chapter.' – Participant 8
Motivation and Support	**Intrinsic motivation:** Many participants were driven by the desire to improve their mental health and alleviate PTSD symptoms. This internal motivation helped them stay committed to the programme.	'Feeling better was the main thing … just desperate to feel better from it all.' – Participant 4
	External motivation and social support: Participants were motivated by external factors, such as helping others or contributing to the greater good, which fuelled their commitment to the programme. Some participants found motivation in sharing their progress with family and friends. This external support system, as well as discussions with loved ones, helped them stay engaged.	'I put it on in the background and I knew she was listening to it … She would listen to that and come in and we discussed like about it then and so yeah I like I like that part about that … ' – Participant 8
	Commitment and resistance: While many participants were motivated to stick with the programme, some experienced resistance, particularly when therapy became emotionally difficult or when life got busy. Self-talk and commitment to the process were key in overcoming this resistance.	'Probably about halfway through, give or take. I actually sat down, I broke down to my wife and said, I don't know if I've done the right thing. I'd just started questioning because I'm opening wounds that I didn't open, and I don't know if it's just me, but people bury it down and I didn't want to bring it up but I knew I had to. And if I didn't, you know was I ever going to, you know, ever fix myself? But yeah, pushing myself … . I wanted to prove to myself I could do it, you know, and again, I've put off getting help for the rest part of 14 years now. So, you know, they always say it's never too late to get help.' – Participant 9
	Reliance on therapists for engagement: Some participants felt highly dependent on their therapists for emotional support and motivation throughout the programme. They reported struggling to engage with the content independently and often delayed completing tasks until just before scheduled sessions. The kindness and professionalism of therapists were highly valued, with participants appreciating their supportive approach in helping them stay on track.	'I do need more of a nudge daily if not every other day to put something on there to what's going on. To make me properly engage with the with the work, the work that's required. So I was like, I was so because I knew I had the weekly meeting, I was cramming it all in the day before or two days before, before the meeting. So, so it looked like I've done it all.' – Participant 1
Reflections on research participation	**Positive research engagement:** Many participants expressed enthusiasm about being part of the trial, with some calling it a 'privilege' to be involved. Several participants emphasised a desire to support others, particularly veterans and those in need of mental health support.	'You know, as I say, I'd do anything to help other people out. And I think whatever, you know, whatever helps is good. You know, I just think it is a good thing, you know, I think if everybody helped everybody else, the world would be a better place.' – Participant 2
	Lengthy and repetitive surveys: Many participants found the surveys to be repetitive, leading to frustration. However, they agreed that the questions were generally relevant, especially when addressing military-related experiences.	'So every question, every question was relevant. I think you captured everything really well.' – Participant 3 'I don't think they missed anything, I think you they just overdo it. You captured everything but it repeats a lot of it repeats itself.' – Participant 8

Post-treatment Therapist Perspectives		
Theme	Sub-theme	Quotes
Overall therapist experience	**Positive reception**: Therapists shared their positive impressions of the programme, highlighting its user-friendliness and its improvements over earlier versions.	'I liked military spring. So it's overall, you know, a fairly good, a fairly good experience I think.' – Therapist 1

(*Continued*)

Table 3. Continued.

Post-treatment Therapist Perspectives		
Theme	Sub-theme	Quotes
	Suitability for self-motivated clients: Therapists noted that the programme was especially effective for clients who were highly motivated to engage with the content and ready to make progress.	'I think for the right person, it would be about right. So if they were really motivated and ready to engage, it'd be fine. But for some of our veterans, they might need a bit longer if there was a lot of avoidance.' – Therapist 2
	Impact on therapist workload: The programme had the potential to alleviate therapists' workloads and support those on waiting lists, though it was not considered a full substitute for direct, intensive therapy.	'If I continue to use this, there is the potential that it could lessen the amount of time that I spent with clients.' – Therapist 6
	Value of psychoeducation for veterans: The programme was found to be especially helpful in educating veterans about PTSD, offering them tools to manage their symptoms and improve their understanding of their condition.	'I thought he would kind of gain something from it and definitely, definitely did. And it was great for that kind of psychoeducation and starting to think about … because he was diagnosed with PTSD just as the programme started. So I think that psychoeducation really helped and started to think about changing some stuff.' – Therapist 7
	Changing perceptions of guided digital therapy: Some therapists initially expressed scepticism about guided digital therapy, but their views changed after observing positive outcomes for clients.	'I think I probably was a little bit reserved about sort of what it was going to be going to be like, how it's going to be utilised. I think it's good to see having a positive case. I think it's been really good to see because they actually did really well. [Participant] didn't need anything else in my service.' – Therapist 3
	Recruitment challenges: Therapists encountered difficulties in recruiting participants citing limited therapist availability or willingness to engage, and challenges with patient readiness.	'For me, there's a bit of a reluctance in some health boards about getting involved in research and guided self-help … ' – Therapist 1
	Variety in daily practice: Therapists enjoyed having the flexibility to alternate between face-to-face sessions and online check-ins, which allowed them to adapt to participant needs.	'So in some ways, I think it's nice as a therapist to have a bit of a mixture in your day … I like that I can do it online as well like this with people who share my screen and I'll have a catch-up. Five to ten-minute catch-up online. That's good. Or do a 30-minute guidance session online. So I kind of like the flexibility of it and I think patients do too.' – Therapist 1
	Therapist impact of failure to engage: Therapists felt stressed and concerned when participants missed sessions or struggled with engagement.	'It stressed me out when I thought I'd got a bit wonky. But also because he was like in the back of my mind, there was a couple of weeks where he was ill and then he didn't get back to me.' – Therapist 6
Device use and flexibility	**Preference for video calls**: Therapists and participants preferred using video calls, such as those through Teams, as they felt this method supported better communication and engagement than phone calls.	'Mainly online, I think the veteran who didn't do as well, I saw him for a couple of face to face sessions in the beginning, but then that went online as well, which I'd say probably like 80% of it was all online. Which I think worked quite well.' – Therapist 3
	Encouraging laptop use: Some therapists felt that encouraging clients to use laptops would make the programme feel more structured and formal, possibly leading to greater engagement.	'I wondered whether the programme would say could say. It needs to be on a laptop and then you'll be making it a little bit more formal, but then again, that's maybe not what you're after, and you're after ease of access.' – Therapist 5
	Value of flexibility: Despite a therapist preference for the use of laptops, they acknowledged that mobile phone access was an important factor for some clients due to ease and accessibility.	'Phone. And yeah that's a good point. Whenever during COVID or whenever I've had to do online sessions because we can't for any reason meet in person. My heart sinks when they do it on their phone. I think that it kind of smacks of a lack of preparation … ' – Therapist 5
Participant difficulties	**Context of trauma**: Some participants dropped out of the programme due to the overwhelming nature of their trauma, particularly when it involved disclosing deeply personal experiences for the first time, compounded by substance use issues.	'I think the reason for dropout … it was the context of his trauma and the fact that it was the first disclosure. So yeah, the trauma memory he wanted to work on, it was the first time he'd ever disclosed that.' – Therapist 2
	Challenges with unhelpful thinking: Some participants faced difficulties in addressing and changing unhelpful thought patterns, often struggling with homework outside of sessions due to motivational or cognitive factors. Some clients found the concept of cognitive biases difficult to understand and struggled with tools like the dysfunctional thought record, leading to frustration.	'Couple of them definitely struggled with that step, challenging unhelpful thinking … not as bright as the female, and not as diligent didn't do as much homework.' – Therapist 1
	Varied participant engagement: Levels of engagement varied greatly between participants, with some consistently completing steps and others struggling with logging in or sticking to a routine. In one case, despite numerous follow-up efforts, a participant disengaged from therapy.	'A veteran or who didn't really get off on me probably wasn't logging in enough, but the other veteran did. He logged it every day. He did like half an hour every day.' – Therapist 3
Technical issues	**Challenges with usability**: Several therapists expressed frustrations with the *Spring Military-PTSD* interface, highlighting issues such as difficulty cross-referencing test-user progress and the clinician dashboard during training.	'Not being able to see the dashboard and the course programme side by side and having to log in and out so I couldn't cross-reference. It was just so clunky.' – Therapist 5
	Data saving issues: Problems with data not being saved properly on the platform led to confusion about participants' progress, making it difficult for therapists to track their clients' engagement.	'When you're doing it so soon, as I'd be like, oh, you know, you've only got on this bit, that's enough. Done more [therapist], before I think that because they weren't saving it, that's the only sort of technical kind of issue really.' – Therapist 3
	Cache clearing: Therapists reported needing to clear their browser cache frequently when switching between accounts, which caused interruptions and inefficiencies.	'I had to clear the cache repeatedly to access the platform if I was switching between my test patient and therapist accounts.' – Therapist 6

experience. Additionally, technical issues such as difficulties with the programme interface and data-saving problems created challenges for some therapists.

4.4.3. Quantitative results

Eleven participants were referred to the study. All were eligible and ten completed baseline assessment and were entered into the study. Of the ten participants, two dropped out, one before starting treatment due to a family illness and one who disengaged midway through, having completed seven steps and became uncontactable for unknown reasons. Engagement with the programme was strong, with eight participants completing all ten steps.

Post-treatment data were available for all eight completers. Of these, four no longer met the diagnostic criteria for PTSD according to the CAPS-5 (Table 4). RCIs, calculated using a Cronbach's alpha of 0.88 (Weathers et al., 2018), indicated that six participants demonstrated statistically significant symptom improvement (*RCI ≤ -1.96). Two participants showed a small improvement but did not reach the threshold for reliable change. No adverse events were reported.

On average, participants received 228.63 min (SD = 20.40) of therapist input, including in-person meetings, video and telephone calls, emails, and intervention-related administrative tasks.

Table 5 presents the mean scores for clinical and functional outcomes before and after treatment. Statistically significant reductions were observed in PTSD symptoms (CAPS-5, ITQ PTSD), DSO symptoms (ITQ DSO), anxiety (GAD-7), and depression (PHQ-9) for both completer ($n = 8$) and ITT ($n = 10$) samples ($p < .05$). However, no significant changes were found in insomnia (ISI), functional impairment (WSAS), alcohol use (AUDIT), global health (EQ5D), or progress towards self-identified goals (GBO). Post-treatment, three participants met criteria for likely CPTSD according to the ITQ, and one met criteria for likely CPTSD. The remaining four did not meet criteria for likely PTSD or CPTSD according to the ITQ.

5. Discussion

5.1. Summary of main findings

This study aimed to develop and preliminarily evaluate a guided digital CBT-TF, adapted from *Spring PTSD,* for use with military veterans. To our knowledge, this is the first study to report on the development and initial testing of a guided digital therapy specifically tailored for UK military veterans with PTSD. The intervention was co-produced with veterans with lived experience, ensuring it was not only evidence-informed but also grounded in the real-world needs and preferences of its intended users.

Table 4. CAPS-5 scores pre- and post-treatment – stage 2 (pilot study).

Participant	Pre-treatment CAPS-5 Score	Post treatment CAPS-5 Score	Change in CAPS-5 Score	RCI	Post-treatment PTSD diagnosis (CAPS-5)
1	33	31	−2	−0.98	Yes
2	33	29	−4	−1.95,	Yes
3	38	6	−32	−15.61*	No
4	40	17	−23	−11.22*	No
5	31	–	–	–	–
6	41	–	–	–	–
7	41	19	−22	−10.73*	No
8	37	24	−13	−6.34*	Yes
9	30	24	−6	−2.93*	Yes
10	39	17	−22	−10.73*	No

*RCI ≤ -1.95.

Table 5. Mean scores of clinical and functional outcome measures pre- and post-treatment – stage 2 (pilot study).

	Completers ($n = 8$)		ITT ($n = 10$)	
Measure	Pre-treatment	Post-treatment completers	Pre-treatment	Post-treatment
CAPS-5	36.30 (4.19)	23.90 (9.77)*	36.38 (3.93)	20.88 (7.95)*
ITQ (PTSD)	19.75 (3.93)	13.63 (5.55)*	19.20 (3.61)	14.30 (5.29)*
ITQ (DSO)	19.63 (3.54)	12.25 (6.56)*	19.80 (2.62)	13.50 (6.47)*
GAD-7	17.00 (2.92)	9.63 (4.34)*	16.50 (3.27)	11.10 (4.95)*
PHQ-9	18.50 (3.74)	8.88 (5.89)*	19.30 (3.77)	10.40 (6.47)*
ISI	20.63 (6.02)	15.63 (6.86)	20.90 (5.34)	16.90 (6.62)
WSAS	26.13 (10.86)	16.88 (9.20)	25.40 (10.49)	18.00 (9.36)
EQ5D Global Health	53.13 (20.07)	54.00 (17.05)	48.80 (21.74)	49.50 (19.81)
AUDIT	9.88 (7.64)	8.25 (5.39)	8.50 (7.47)	7.20 (5.43)
GBO	2.44 (2.62)	3.63 (1.77)	2.55 (2.69)	3.50 (1.65)

Note: **ITQ (PTSD)**: International Trauma Questionnaire – PTSD sub-scale; **ITQ (DSO)**: International Trauma Questionnaire – disturbances in self-organisation sub-scale; **GAD-7**: Generalised Anxiety Disorder-7; **PHQ-9**: Patient Health Questionnaire-9 (depression); **ISI**: Insomnia Severity Index; **WSAS**: Work and Social Adjustment Scale; **EQ5D Global Health**: Health-related quality of life; **AUDIT**: Alcohol Use Disorders Identification Test. **GBO:** Progress towards Goal Based Outcomes.

*Statistically significant at $p < .05$.

Key themes from the initial focus groups with veterans with lived experience of PTSD revealed several important considerations for adapting *Spring PTSD* for military veterans. Participants expressed a preference for a relatable narrator with a regional accent and emphasised the need for authentic military representation in the characters. They also highlighted the importance of using diverse visual imagery and military-inspired colours to enhance engagement. Veterans stressed the significance of tailoring the content to address their specific needs, such as hypervigilance, emotional regulation, and anger management. Additionally, there was a desire to include optional resources for families and friends. These insights guided the adaptation of the intervention to ensure it was relevant, engaging, and met the unique needs of military veterans.

Pre-treatment interviews revealed a mix of apprehension and optimism regarding the guided digital therapy. Many participants expressed concern about the potential for therapy to exacerbate symptoms or trigger emotional distress. Additional worries included feeling unsupported, staying motivated, and encountering usability issues. However, they also conveyed hope and enthusiasm, highlighting the flexibility and self-paced nature of the intervention as key advantages. Therapists shared a similarly mixed perspective. While many were hopeful that the intervention could help reduce waiting lists and lead to positive outcomes, concerns about engagement and efficacy, especially for veterans struggling with self-motivation, were also raised. Overall, both participants and therapists expected *Spring Military-PTSD* to be effective.

Ten participants were enrolled in the pilot study of *Spring Military-PTSD*, with a dropout rate of 20%, consistent with attrition from trials of the civilian version of *Spring PTSD* and typical dropout rates observed in PTSD psychological therapy research (Lewis et al., 2020). One participant did not begin the treatment due to a family illness, and another disengaged midway through and became uncontactable. Despite this, engagement was high, with eight participants completing all ten steps, suggesting the programme is acceptable and well-received by those who engage. Post-treatment data from the eight treatment-completers revealed significant improvements in PTSD symptoms. Four participants no longer met diagnostic criteria for PTSD according to the CAPS-5, and RCIs showed that six participants demonstrated statistically significant symptom reduction (RCI ≤ -1.96). However, two participants did not meet the threshold for reliable change. This suggests that the intervention may benefit from further refinement, or that a more targeted approach, based on a better understanding of the characteristics of those most likely to benefit, could improve outcomes.

The change in mean CAPS-5 score was smaller than in an RCT of the civilian version of *Spring PTSD* (Bisson et al., 2022). This difference was expected. The previous trial involved individuals with mild to moderate PTSD to a single trauma. In contrast, the current sample consisted of military veterans with PTSD to multiple traumas. The average time since discharge was over 16 years, half had received prior talking therapy, and all met the ITQ criteria for CPTSD, making them arguably more difficult to treat.

Overall, there is weaker evidence for the effectiveness of digital therapy (with and without guidance) for veterans with PTSD compared to civilian populations. However, our study represents a promising step forward, highlighting the potential of carefully tailored guided digital CBT-TF to address the needs of this population. Our findings were comparable to an uncontrolled study of 24 OEF/OIF veterans using afterdeployment.org with phone support, though not all participants in that study met diagnostic criteria for PTSD at baseline (Belsher et al., 2015). Outcomes were better than those of a trial of a military-adapted version of *Interapy*, which found no significant reduction in PTSD symptoms (Niemeyer et al., 2020). Our findings were also more favourable than those synthesised in a recent review of PTSD Coach, a free mobile app developed by the United States Department of Veterans Affairs (VA) that offers PTSD education, self-assessment tools, and coping strategies (Bröcker et al., 2023). The review found no significant effect on symptom reduction (SMD = −0.19, $p = .09$). However, it's important to note that PTSD Coach is not a trauma-focused psychological therapy, and most of the studies lacked therapist guidance, which is known to enhance the effectiveness of digital therapies (Lewis et al., 2019).

In terms of secondary outcomes, *Spring Military-PTSD* significantly reduced mean self-reported PTSD symptoms (ITQ PTSD), disturbance in self-organisation (ITQ DSO), anxiety (GAD-7), and depression (PHQ-9) in both completer and intent-to-treat samples, supporting its potential efficacy in addressing key PTSD-related symptoms in military veterans. However, no significant changes were observed in insomnia (ISI), functioning (WSAS), alcohol use (AUDIT), global health (EQ5D), or progress towards self-identified goals (GBO). Some outcomes, such as sleep, alcohol use, and functioning, may be less responsive to short-term change and could require more targeted or longer-term interventions. For example, sleep issues and functional impairments are often persistent, and alcohol use may not improve without specific support. Additionally, participant characteristics, such as the chronicity of PTSD and prior treatment history, may have influenced symptom reduction, particularly in secondary outcomes. As *Spring* continues to be developed, future iterations

could explore a more modular delivery approach to better personalise content and address individual needs more effectively.

Participant feedback from post-treatment interviews highlighted both the strengths and challenges of *Spring Military-PTSD*. Participants expressed high satisfaction, especially appreciating its flexibility, accessibility, and therapeutic techniques, with many viewing it as a valuable alternative to traditional face-to-face therapy. However, challenges such as technical issues and the emotional intensity of some content were noted, which sometimes impacted engagement. Suggestions for improvement included the ability to upload handwritten notes, skip content, and access downloadable resources to enhance the user experience. Feedback also emphasised the importance of therapist support and personal motivation in maintaining engagement. Therapists generally found the programme user-friendly and noted its potential to alleviate their workload by providing an alternative to intensive therapy, though they agreed it should not replace in-person sessions entirely. They also appreciated the flexibility to combine face-to-face and online sessions but were concerned about missed sessions and engagement difficulties, which sometimes caused stress. Technical difficulties, including issues with the programme interface and data-saving problems, were also highlighted as barriers, suggesting the need for further refinement of the platform.

Although the programme was designed to address veteran-specific concerns such as anger and emotional regulation, participants did not provide detailed reflections on the relative value or weighting of specific content areas, including the three additional steps focused on DSO symptoms. This may be because they had not previously received face-to-face trauma-focused psychological therapy and therefore may have lacked a clear basis for comparison. As a result, their feedback tended to focus more on the overall acceptability, emotional impact, and usability of the programme rather than on the specifics of content emphasis. Given the relevance of difficulties such as anger in this population, future evaluations could more explicitly explore perceptions of content balance and whether certain therapeutic elements warrant greater focus or clearer integration.

5.2. Strengths and limitations

This study builds on an existing evidence-based guided digital therapy for PTSD, adapting it specifically for veterans through a co-production approach. The development process followed the MRC framework, ensuring systematic and rigorous adaptation and refinement of the intervention (Skivington et al., 2021). One of the key strengths was the use of the CAPS-5 as the primary outcome measure, which is considered the gold standard for PTSD assessment. Additionally, the purposive sampling strategy ensured that veterans from a range of military backgrounds and different regions of Wales were included, increasing the potential relevance and applicability of the intervention to the broader veteran population.

Despite these strengths, the study had several important limitations. While the co-production approach allowed for valuable input from veterans during the intervention adaptation stage, not all participant suggestions could be implemented. For instance, ethical and practical constraints prevented the inclusion of real-life veterans sharing their own experiences. Instead, characters based on real veteran experiences were used to maintain authenticity while ensuring ethical compliance. Similarly, while some participants recommended therapist-led family sessions, others expressed concerns that this might not be appropriate. In response to this feedback, an information leaflet on military PTSD was developed, giving veterans the option to share with others if they wished.

There were also limitations to the pilot study. As a small case series without a control group, it was not possible to determine whether the observed improvements were specifically due to *Spring Military-PTSD* or attributable to other non-specific factors, such as the passage of time or a placebo effect. However, the primary aim of this study was to refine the intervention rather than establish efficacy. Nevertheless, the small sample size means that the findings should be interpreted with caution, since they are unlikely to be generalisable to the wider veteran population with PTSD. Furthermore, the absence of a longer-term follow-up assessment prevents any conclusions regarding the durability of treatment effects.

Another limitation concerns treatment fidelity. While therapists followed a structured manual and received ongoing clinical supervision, treatment fidelity was not formally assessed. The absence of fidelity measures makes it difficult to determine whether the intervention was delivered consistently across participants. Future studies will incorporate objective fidelity measures to strengthen the robustness of the findings.

Another key limitation is the lack of diversity within the sample. Most participants were white, middle-aged males. While this demographic is reflective of those commonly accessing veteran services in Wales, it nonetheless restricts the generalisability of the findings. The homogeneity of the sample may have limited the range of perspectives captured, particularly regarding how different demographic groups engage with and respond to the intervention. Additionally, it is important to consider the increasing digital literacy of younger generations, who may be more comfortable using mobile phones rather than laptops or PCs for digital interventions. Future research should prioritise recruiting a more diverse

sample, including veterans from different ethnic backgrounds, age groups, and more women, to ensure the intervention is applicable to a broader population.

Lastly, capturing goal-based outcomes proved problematic. While participants were reminded of their goals, they were not reminded of their initial progress ratings. As a result, some participants reported being further from their goals than initially specified, despite qualitative feedback suggesting otherwise. This led to minimal difference between pre- and post-treatment means, as progress reports were countered by those who reported lower progress ratings than before. Reminders of initial ratings would improve the precision of goal-based outcome assessments.

5.3. Clinical implications

Our findings suggest that *Spring Military-PTSD* has the potential to improve access to evidence-based PTSD treatment for veterans by providing a scalable, resource-efficient alternative to traditional in-person therapy. With therapist shortages and high treatment costs posing significant barriers, guided digital interventions could help expand service capacity and reach veterans who might otherwise struggle to access care. The relatively low therapist input required (just under four hours on average) suggests that this approach could be a viable option for overstretched mental health services. Encouraging engagement and completion rates indicate that guided digital therapy with *Spring Military-PTSD* may help overcome common barriers such as stigma and scheduling issues. While further research is needed to establish its efficacy and gain an indication of the sustainability of treatments effects, these findings highlight the potential for guided digital CBT-TF to increase access to PTSD treatment, including in low- and middle-income countries (LMICs), where specialist trauma care is often limited.

5.4. Research implications

The findings from the pilot study provide an important initial step in the development and evaluation of *Spring Military-PTSD*. Although the results suggest that the intervention is feasible and has potential benefits, further research is critical to rigorously assess its effectiveness and understand the conditions under which it may be most beneficial. The next logical phase of research is to conduct a feasibility RCT to provide further proof of concept and evaluation of recruitment strategies, participant engagement, and retention rates. In addition, it would help determine the most appropriate outcome measures, treatment duration, and frequency, refining the intervention for larger-scale studies. If the feasibility RCT demonstrates positive outcomes and feasibility, a definitive RCT would be the next step to assess the effectiveness of *Spring Military-PTSD*. Such a study would need to be adequately powered to detect clinically meaningful differences in PTSD symptom reduction, while also evaluating longer-term outcomes. A definitive RCT would also allow for comparisons to other evidence-based treatments, such as in-person CBT-TF or other digital interventions, to determine whether *Spring Military-PTSD* offers advantages in terms of accessibility, cost-effectiveness, and scalability compared to other options. Moreover, future research could focus on understanding the mechanisms of change within *Spring Military-PTSD*, exploring which specific components of the intervention are most effective for different subgroups of veterans. Identifying predictive factors for treatment response, such as baseline symptom severity, demographic characteristics, and comorbid conditions, could lead to more personalised interventions and optimise treatment outcomes.

6. Conclusion

While this study provides preliminary evidence, further research is necessary to rigorously establish the effectiveness of *Spring Military-PTSD* and explore its potential for widespread adoption in clinical settings. With the growing demand for accessible PTSD treatments, particularly among military populations, *Spring Military-PTSD* has the potential to serve as a valuable tool in expanding mental health care options for veterans.

Author contributions

CL, JIB, NR, NK, TK and MC conceived and designed the study. CL and JB secured grant funding and oversaw management of the project. BT and JWSY screened participants, obtained informed consent, and collected data. CL, BT and JWSY analysed the data. All authors contributed to the manuscript. The corresponding author confirms that all listed authors meet the criteria for authorship and that no eligible authors have been omitted.

Disclosure statement

Spring Military PTSD was developed by and is owned by Cardiff University and, if commercialised, Cardiff University would benefit, as would authors CL, JIB, NR, NK, TK and MC. The remaining authors have no competing interests.
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Ethics approval and consent to participate

Ethics and regulatory approvals have been secured for our trial from the Wales Research Ethics Committee 2 (IRAS ID: 28768) and participating NHS sites. All participants will provide informed consent.

Data availability statement

The data that support the findings of this study are available from the corresponding author, CL, upon reasonable request.

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