PETT
PTSD treatment trial

A Feasibility Randomised Controlled Trial of Reconsolidation of Traumatic Memories compared to Trauma Focused Cognitive Behaviour Therapy for PTSD in UK military veterans

Sturt J, Rogers R, Armour C, Cameron D, De Rijk L, Fiorentino F, Forbes P, Glen C, Grealish A, Kreft J, Spikol E, Tzouvara V & Greenberg N.

FiMT forces in mind trust
COMMUNITY FUND
inspire workplaces
KING'S College LONDON
QUEEN'S UNIVERSITY BELFAST

Foreword

Amongst the founding priorities of Forces in Mind Trust (FiMT) is 'to promote better mental health and well-being' and 'to build organisations' capacity to deliver evidence-based prevention and rehabilitation'. Since its inception, the Trust has therefore worked hard to develop an improved understanding of the mental and related health of former Service personnel and potential evidence based interventions to provide effective support.

One of our policy goals is to ensure that all former Service personnel and their families are able to access good quality health and social care services, when and where they need them, as we recognise that this is a crucial step to them achieving a successful and sustainable transition to civilian life. To help deliver this, FiMT has provided support to those who identify, develop and trial quality and bespoke treatments that aim to offer symptom relief to former Service personnel who may be suffering Post Traumatic Stress Disorder (PTSD), giving them and their families the best chance of a fulfilling civilian life after Service.

This study, investigating the feasibility of using a novel treatment approach - the Reconsolidation of Traumatic Memories (RTM) - represents an important first step in evidencing a potentially new psychological intervention for the treatment of PTSD and complex PTSD in UK military veterans.

Whilst the outcomes are provisional, they are promising and suggest that the time is now right to conduct a large scale trial to potentially provide a valuable and innovative new approach and effective support.

Michelle Alston
Chief Executive, Forces in Mind Trust

Forces In Mind Trust

Forces in Mind Trust was founded in 2011 with a £35 million endowment from the National Lottery Community Fund to improve transition to civilian life for Service leavers and their families.

Our mission is to enable successful and sustainable transition to civilian life, and the Trust's strategy is to provide an evidence base that will influence and underpin effective policy making and practice.

By funding high quality, credible research where there is an identified gap in relevant understanding, and by then exploiting the findings, FiMT aims to effect positive change.

Contents

List of Tables and Figures

List of Acronyms

CAPS-5	Clinician Administered PTSD Scale for DSM-5
CI	Confidence Interval
CONSORT	Consolidated Standards of Reporting Trials
COVID-19	Coronavirus Disease 2019
CPTSD	Complex Post-traumatic Stress Disorder
CTU	Clinical Trials Unit
DMEC	Data Monitoring and Ethics Committee
DSM-5	Diagnostic and Statistical Manuel of Mental Disorders, 5th Edition
eCRF	electronic Case Report Form
EMDR	Eye Movement Desensitisation and Reprocessing
EQ-VAS	EuroQol-Visual Analogue Scale
GAD-7	Generalised Anxiety Disorder scale (7 item)
GP	General Practitioner
ITQ	International Trauma Questionnaire
ISRCTN	International Standardised Randomised Controlled Trial Number
KCL	King's College London
MCID	Minimal Clinically Important Difference
NHS	National Health Service
NI	Northern Ireland
NICE	National Institute for health and Care Excellence
NLP	Neurolinguistic Programming
PCL-5	PTSD Checklist for DSM-5
PCL-M	PTSD Checklist Military version
PETT	PTSD Experimental Treatment Trial
PHQ-9	Patient Health Questionnaire (9 item)
PPI	Patient and Public Involvement
PSS-I	PTSD Symptom Scale Interview
PTSD	Post-traumatic Stress Disorder
QPR	Quality of Process of Recovery scale

QUB	Queen's University Belfast
RCT	Randomised Control Trial
RTM	Reconsolidation of Traumatic Memories
SD	Standard Deviation
TF-CBT	Trauma-Focused Cognitive Behavioural Therapy
UK	United Kingdoms of Great Britain and Northern Ireland
USA	United States of America
WSAS	Work and Social Adjustment Scale

Executive Summary

Background: Post traumatic stress disorder (PTSD) occurs more commonly in military veterans than the general population(7-17% vs 4.4%). Whilst current therapies are known to work, up to half of veterans who start treatment for their PTSD do not finish the therapy course. Reconsolidation of Traumatic Memories (RTM) protocol is a new talking therapy with promising findings found in several small US veteran studies. It also appears straightforward to train therapists to deliver it from different professional backgrounds and length of experience. This study aimed to examine the feasibility of carrying out a large trial of RTM with UK veterans. The larger trial would offer absolute proof that the promising findings reported within this initial feasibility study were not due to chance. Before such a large-scale study could be undertaken, we needed to first design and test a research study method to ensure we could recruit to and retain veterans in a larger study.

Methods: A randomised controlled feasibility trial followed by an interview study. A feasibility trial aims to ask the question "Can a large trial be undertaken?". Sixty UK military veterans were randomised to RTM (n=35) or Trauma Focussed Cognitive Behaviour Therapy (TF-CBT) (n=25). We were most interested in the RTM outcomes and so we randomised more veterans to RTM therapy than to TF-CBT. This is an acceptable method in trials when one trial therapy (i.e. TF-CBT) already has proven itself to be effective for PTSD and our main research interests were to determine whether the trial procedures would work and what the RTM results would be in the UK. We aimed to determine how quickly we could recruit veterans to the research, understand whether they would be happy to be randomly allocated to either therapy, and would remain both in therapy and complete the follow up questionnaires during and following treatment. Finally, we needed to know if, and by how much, RTM improved PTSD symptoms so that we could calculate how large the next larger trial would need to be. In the interviews we explored veterans' experiences of joining the trial, the research procedures and therapy, and how to improve the research design for future veteran studies. UK military veterans

with a diagnosis of PTSD or complex PTSD were recruited between January 2020 and June 2021. The main outcome of interest was feasibility. To assess overall feasibility of our trial method we developed criteria using a traffic light system. In relation to the criteria set (criteria explained on page 19) we awarded it green= criteria fully met, amber = criteria need some adjustment, and red = not coming close to meeting the criteria, progression to large trial not appropriate. Alongside feasibility outcomes we assessed PTSD symptoms, depression, anxiety and mental health recovery and rehabilitation as additional outcomes. Data were collected at baseline following provision of informed consent by the veteran and before being allocated to either therapy. Follow up data were collected 6-, 12- and 20-weeks following randomisation. Interviews with fifteen veterans were conducted after 20 weeks. Both therapies were delivered by charity sector therapists specifically trained in the two therapies by the team. To advise the research team on research procedures and mental health therapy issues important to veterans, their family members, veteran charities and therapists we held eight meetings and workshops with these groups to support the study with public and patient involvement.

Results: Of the 60 veterans participating in the study, average age was 53yrs; 55 were male, 56 were white British, and 46 had served for ≥5yrs. The average pre-therapy PTSD symptoms score assessed by the PTSD checklist, PCL-5, was 57. Fifty had complex PTSD and 39 had experienced four or more traumas. Seven of the eight traffic-light progression criteria turned green. The RTM group just missed the criteria for the numbers finishing therapy and this turned amber. There were no red criteria. Veterans who had received RTM therapy reduced their PTSD symptoms by 18 points. This exceeds the size of reduction that mental health professionals expect to see following therapy for PTSD (i.e. a reduction of 10 points). TF-CBT group participants experienced an average reduction of 8 points which narrowly misses the expected symptom reduction size. Forty eight percent of those receiving the RTM arm no longer had a PTSD diagnosis at 20 weeks post randomisation compared to 16% in the TF-CBT arm. All veterans reported largely positive experiences of the therapy and research procedures and offered a few ways to improve them.

Conclusion: The trial demonstrates that it is feasible and acceptable to undertake psychological therapy trials in veterans and that they will put their trust in research projects aimed at improving the mental health and wellbeing of themselves and of their community. High levels of engagement between the veterans and the research team throughout, and strong therapeutic rapport between the veteran and their therapist, were key factors to sustained engagement. Training of therapists in both groups was successful in terms of delivering good quality RTM and TF-CBT therapies. Differences found between therapies in relation to PTSD symptom reduction and loss of diagnosis may be a consequence of the need to further assess veterans' general mental health to ensure they are therapy-ready at the recruitment stage. TF-CBT is a much longer therapy and consequently demands more of the veteran than does RTM (e.g time commitment, emotional resilience to discuss the trauma) which may account for the differences we found. Our veteran sample had high levels of mental ill-health and in that respect is representative of the broad veteran population living with PTSD. It was, however, largely male, and white, which does not reflect the full diversity of veterans living with PTSD. The study recruitment procedures for a larger study will require greater inclusivity. We found RTM therapy to remain a promising psychological intervention for the treatment of PTSD, including complex PTSD in military veterans. With specific strengthening, the research design is fit for purpose in delivering a larger trial to determine whether RTM works in this population.

Full Report

1.0 Introduction

Posttraumatic stress disorder (PTSD) is a mental health diagnosis experienced by an important fraction of people who are exposed to a traumatic event. The symptoms of PTSD, including avoidance, re-experiencing, alterations in mood and cognition and arousal, can be intense and disabling and in some cases may persist for years after the event. While a minority of trauma-exposed service personnel experience PTSD, its effects can be wide-ranging adversely affecting functioning, physical and mental health and family/interpersonal relationships. The prevalence rate of PTSD in United Kingdom (UK) Armed Forces veterans is estimated at 7% (King's Centre for Military Health Research, 2022) although up to 17% of recently combat exposed veterans report symptoms consistent with a PTSD diagnosis (Stevelink et al., 2018). These rates are considerably higher than the 4.4% rate of PTSD amongst the UK general population (Roberts et al, 2014) (Fear et al., 2014). Stigma, negative beliefs about mental healthcare and its efficacy, recognition of the need for mental health care, as well as logistical barriers to accessing care continue to prevent many veterans from seeking the care that they need (Rafferty, Stevelink, Greenberg, & Wessely, 2017). The result is that many veterans who are struggling with PTSD symptoms fail to seek professional care and instead they, and their families, continue to suffer which in turn may lead to potentially worsening psychological distress over time.

To illustrate this with reference to one UK region, Northern Ireland (NI), a recent study of 1,267 NI veterans found that 36.8% met criteria for PTSD (Armour, McGlinchey, & Ross, 2021). Barriers to care for NI veterans include difficulties accessing NHS psychological services, registering with a GP, reluctance to disclose their veteran status, and issues of social exclusion, self-stigma, and decreased confidence in NHS services due to the cultural context of the Troubles (Armour et al., 2017). There is a profound lack of dedicated veteran NHS services in NI, with waiting list treatment targets upwards of 52 weeks, as compared to 18 weeks in other parts of the UK (Hasan & Bashford, 2017). These wait times are increasing as funding cuts to the NHS and the impact of the COVID-19 pandemic have resulted in fewer staff and increasing demand.

Just like civilians, veterans with PTSD who access statutory care are recommended to be provided with National Institute for health and Care Excellence (NICE) approved treatments for PTSD which include Trauma-Focused Cognitive Behavioural Therapy (TF-CBT) and Eye Movement Desensitisation and Reprocessing (EMDR) therapy. NICE typically recommends eight to 12 sessions but acknowledges that more complex presentations may require a greater number of sessions. TF-CBT encompasses a range of approaches which, overall, involve modifying negative emotions associated with the traumatic event to ease symptomatic behaviour associated with PTSD distress (Figure 1), such as is described within the cognitive model of PTSD (Ehlers & Clark, 2000). On the other hand, EMDR therapy is typically described as 'reprogramming' neural networks associated with memories of the traumatic event by introducing new information (Figure 2). Both of these therapies are recommended by NICE although EMDR is not thought to be especially useful for combat-related trauma meaning that TF-CBT is often viewed as being the preferable approach for most veterans.

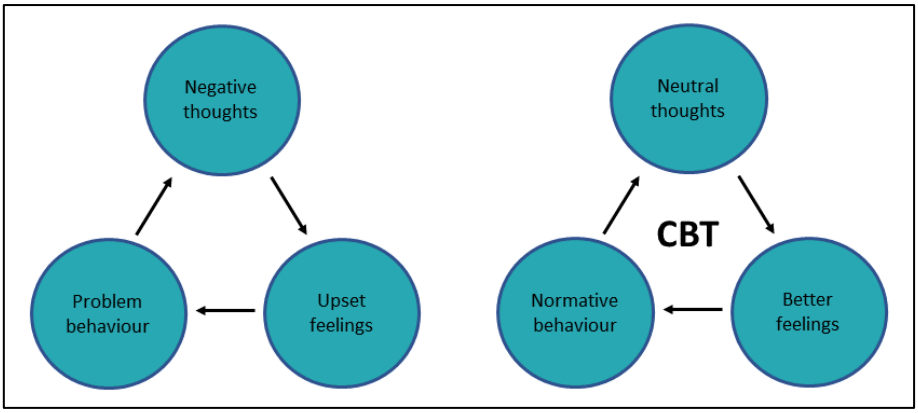

Figure 1. Trauma-Focused CBT mechanisms

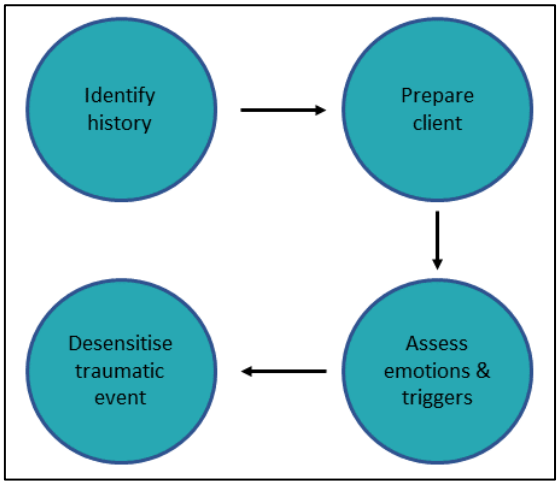

Figure 2. EMDR mechanisms

Unfortunately, non-response rates to TF-CBT can be as high as 50% (Kar, 2011). Veterans can face multiple barriers to accessing care and experience lower TF-CBT efficacy for their 'type' of trauma (National Institute of Health and Care Excellence, 2018). There can be little doubt that effective interventions for treating PTSD in veterans which can be delivered rapidly, and by therapists who do not require extensive training, would greatly benefit veterans.

This feasibility study investigates the use of just such a novel treatment approach called Reconsolidation of Traumatic Memories (RTM) which is based on Neurolinguistic Programming (NLP). NLP is an approach which utilises the association between neurological processes of language/language patterns and behaviour, specifically concerning sensory perceptions and memory. In understanding an individual's sensory attunement and its relationship with memory consolidation, a therapist can more effectively communicate with the client to help change their thoughts, emotions, and behaviours around distressing topics (Sturt et al., 2012). The RTM Protocol is best described as a brief cognitive intervention with minimal and non-traumatising exposure to the original stimulus. It aims to reconsolidate or 'rewrite' aspects of the traumatic memory to decrease both emotional distress and physiological reaction (Kindt & Soeter, 2013; Schiller & Phelps, 2011) (Figure 3). The reduction in distress and PTSD symptomology is reflected by a reduction in scores on the scale being used to measure PTSD in the participants.

In practice, the therapist asks clients about flashbacks, nightmares, and trauma-related events in a setting and manner that is safe and non-traumatizing. The clients are guided to practice one of

the main elements of the RTM protocol on a memory of a neutral event first. They are directed to envision sitting in a comfortable, darkened cinema and viewing or 'rewinding' the 'film' of their memory as needed. Once acquainted with the process, the client and therapist can move to working on the memory of the trauma event while remaining safe and non-traumatised throughout the process. They are taught how to view the memory while distancing themselves from the event. As they go through the visual formatting, they may notice how the physical sensations related to the events decrease during each session. Typically, clients find that their symptoms have subsided after 3 sessions.

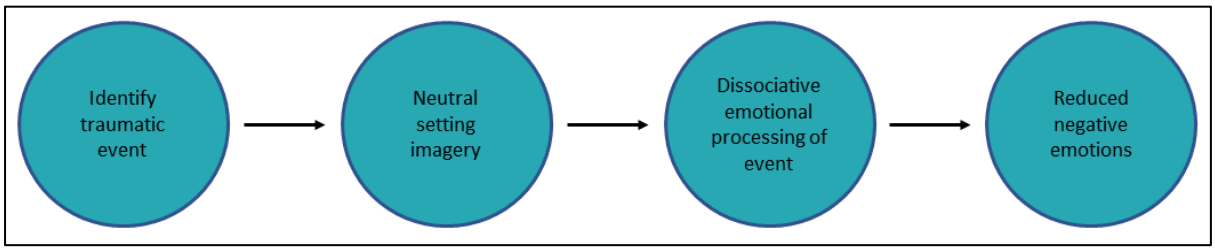

Figure 3. RTM mechanisms

Therapeutic techniques featuring NLP have recently risen in popularity amongst UK mental health charities because it does not require the client to describe the trauma in detail to the therapist. While the client and therapist begin by identifying the traumatic event casing distress, the experience of memory 'playback' and emotional dissociation take place as visualisation for the client. Thus, RTM is considered non-trauma-focused, has the potential to be cost-effective compared to other therapies for PTSD, and has shown efficacy in small pilot and randomised control trials (RCTs), including in veteran populations. These veteran studies have shown RTM therapy to both reduce symptoms in PTSD and for some, reduce them sufficiently that they no longer meet the diagnostic criteria for PTSD. This displays a clear mandate for additional research with veterans for RTM efficacy (Gray & Bourke, 2015; Gray & Teall, 2016; Gray, Budden-Potts, & Bourke, 2017; Tylee, Gray, Glatt, & Bourke, 2017; Gray, Budden-Potts, Schwall, & Bourke, 2021).

Several small-scale studies in the United States have tested the efficacy of RTM in veteran populations, with results showing high completion rates (ranging from 87% to 100%) and low participant dropout. Noted was a rapid decline in PTSD symptomology after several sessions as indicated by a reduction in scores on the PTSD Symptom Scale Interview (PSS-I) or PTSD Checklist Military Version (PCL-M) and population reduction PTSD diagnosis using the *Diagnostic and Statistical Manual of Mental Disorders, 5th* Edition (DSM-5) criteria. Outcomes were best in participants without active substance abuse problems or other unmanaged psychopathologies. The therapy was well tolerated by the participants and no significant issues arose regarding therapist training or therapy delivery.

While these results are quite impressive at first glance, the populations were small, the long-term effects of RTM on PTSD symptoms, help-seeking behaviour, and other psychological outcomes were not tested, and the potential short-term and long-term risk of harm is unknown. It also must be noted that the overall effectiveness of NLP-based therapies in addressing PTSD symptomology and/or distress has not been tested in large-scale general population samples, nor is it currently validated as a recommended therapeutic technique for treating PTSD and has been criticised for its lack of methodological rigor and a theory-based framework. It is evident that well-designed RCT studies are

needed to properly assess the value of RTM as a potentially cost-effective, valid treatment for PTSD in a UK veteran population.

The main goal of the PTSD Experimental Treatment Trial (PETT) Study was to undertake a pilot RCT for feasibility as a precursor to exploring a fully powered RCT. This pilot would adhere to CONSORT 2010 guidelines (Eldridge et al., 2016), a framework for improving reporting, understanding, and assessment of RCTs.

The PETT Study aimed to utilise an RCT design to:

- determine the rate of trial recruitment, retention in treatment and research, reasons for drop out and determine completeness of outcome data assessed against progression criteria to determine if a fully powered trial is deliverable
- undertake exploratory analyses of the outcome data to support a power calculation for a fully powered non-inferiority trial
- evaluate and understand any risks
- establish an expanded mental healthcare capacity across Northern Ireland to enable both interventions to be delivered close to a NI veteran's home

Inspire Wellbeing in NI was the therapy delivery partner due to their location and employment of veteran face-to-face counsellors as therapy delivery was originally intended to be face-to-face. However, due to the COVID-19 pandemic and effects that the series of national lockdowns had on in-person recruitment and therapy delivery during this time, the participant eligibility criteria were widened to include veterans across the UK.

Within these broad aims were more specific avenues of inquiry, including:

- the delivery of therapy
    - ability of therapists to deliver both interventions
    - willingness of statutory and charity sectors to refer to an experimental NLP-based therapy and specific referral pathways
- participant safety
    - ability of the safety protocol (Appendix 1) to detect and limit consequences of adverse events
    - any clinical governance implications
- participant-centred issues
    - presentation rate of diagnosed PTSD and comorbidities
    - per-participant cost of delivering RTM
- trial data collection
    - level of complete and missing data
    - meeting the progression criteria
    - participant recruitment of N=60 in 14 months
    - at least 70% of participants completing treatment
    - retention of at least 36 participants by the 20-week follow-up

2.0 Methods

2.1 Research design

The PETT Study utilised a randomised controlled trial design featuring two 'parallel' groups of participants and a post-trial qualitative interview study. After meeting the eligibility criteria (see below), participants were randomised into either the group receiving the experimental therapy (RTM) or the comparison therapy (TF-CBT). At 20 weeks post-intervention, participants were invited to participate in a qualitative interview about their experiences with the study. The trial protocol was registered with the International Standard Randomised Controlled Trial Number registry (ISRCTN) on 01/10/2019 (Ref. #ISRCTN10314773). Ethical approval was granted by King's College London's Research Ethics Committee on 19/04/2019 (Ref. # HR-18/19-11320), and by Queen's University Belfast's Faculty Ethics Committee on 13/09/2019 (Ref. #EPS 19_234).

2.1.1 Sample size

In determining an appropriate sample size for an external pilot RCT for later estimation for a larger RCT, it is recommended to estimate by measured outcome to ensure a viable sample size after accounting for attrition (Teare at al., 2014). Trials comparing therapy and research attrition rates associated with TF-CBT and EMDR found a range 8 – 58% with a mean of 29%. Informed by these data, it was proposed to screen 180 potential participants for eligibility and randomise 60 participants.

2.1.2 Trial management and oversight

A project management group of all investigators and the research team met on six occasions. The research teams from both KCL and QUB met every two weeks to monitor recruitment, retention, and safety. The Trial Steering Committee consisted solely of members with veteran health expertise: a consultant psychologist, a consultant forensic psychiatrist, an independent statistician, and a charity representative. The Data Monitoring and Ethics Committee (DMEC) comprised a consultant clinical psychologist, a psychological therapist, and a charity representative. These committees met jointly on three occasions, with participant safety discussed at each meeting.

2.1.3 COVID-related changes

Due to COVID-19 related recruitment delays associated with lockdowns and reduced therapists' capacity in the comparison treatment arm, three changes were made to the study protocol after consultation with the TSC, the DMEC, and the KCL Ethics Committee. Randomisation was changed from a 1:1 ratio to a 2:1 ratio favouring the experimental treatment arm, recruitment was widened from NI to the entire UK, and the recruitment period was extended by an additional six months. Therapy delivery moved online after a six week 'pause' to enable the therapy provider to incorporate online therapy delivery into their toolbox and subsequently all therapies were delivered via videocall.

2.2 Participants

2.2.1 Recruitment and eligibility screening

Recruitment took place between February 2020 and June 2021 and was managed via a targeted social media campaign, public engagement work with veteran charities, and the charity clinical partner, Inspire Wellbeing. Potential participants contacted a dedicated PETT study email address or were referred from veteran support agencies. After signing a GDPR compliant personal data processing consent form, they completed the PTSD Checklist for DSM-5 (PCL-5) to screen for eligibility (Table 1). Veterans with a score >32 on the PCL-5, indicating probable PTSD, were invited to undergo the informed consent process and collection of baseline data. A PTSD and complex PTSD

(CPTSD) diagnostic interview was undertaken by a consultant clinical psychologist at Inspire using the Clinician Administered PTSD Scale (CAPS-5) and the International Trauma Questionnaire (ITQ), for use with the International Classification of Diseases (ICD-11).

Table 1. PETT Study inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Adults >18 years	Serving personnel
UK military veterans (Royal Navy, Army, Royal Air Force)	Currently receiving psychological treatment for PTSD
PTSD diagnosis using the Clinical Administered PTSD Scale (CAPS-5)	Comorbid mental illness sufficiently severe as to prevent treatment cooperation
Symptoms causing clinically significant distress or impact on functioning	Alcohol/substance dependence
Exposure to one or more traumas	Suicidality within the previous month
Living or working in the UK	Unable to provide informed consent
	Medication changes in the previous 4 weeks
	Any other reason after Clinical Psychologist assessment

2.2.2 Participant safety

Adverse events were defined and monitored, with care escalation procedures in place. An adverse event was considered a ≥10 point rise in the self-report PCL-5 since the previous therapy session, a 15 point rise from baseline, or the maximum score (80) being reached. RTM participants were regularly reminded of emergency and non-emergency contacts details for a trial-funded, but independent, trauma-experienced Clinical Psychologist. Depression severity follow-up data were reviewed within 48 hours of receipt to identify anyone at risk of self-harm.

2.2.3 Randomisation

Participants were randomised within 30 days of baseline assessment. The KCL Clinical Trials Unit (CTU) provided a computer randomisation system which generated unique participant IDs and randomised participants to therapy 'A' or 'B'. One member of the research team and an administrator remained 'unblinded' (aware of participant allocation) for purposes of communication with the participants and the therapists, data entry/administration, and to monitor participant safety. Unblinded individuals had no contact with participants or their research data.

2.3 Interventions and delivery

The clinical elements of the trial were delivered via Inspire Wellbeing, a third sector organisation in Belfast, Northern Ireland, that holds statutory contracts to treat and support people with mental health conditions and has considerable experience in working with veterans. Treatments were delivered by seven therapists who had no previous experience of RTM or TF-CBT and who were randomly allocated to therapy training. All therapists received therapy-specific clinical supervision with their respective trainer, were assessed as competent prior to therapy delivery, and all therapy was delivered online (videocall) by a single therapist.

RTM therapists undertook pre-course reading, 40 hours over five days of face-to-face classroom teaching, and four hours of symptom assessment. Therapy delivery on two trauma patients was observed and assessed by the RTM trainer/supervisor and by an external assessor from the United States of America (USA). TF-CBT therapists undertook 24 hours of face-to-face classroom teaching including reflective exercises and practical clinical examples of key intervention strategies, with

competency assessed as the training progressed. These training protocols align with the usual standards for the respective therapy.

2.3.1 Therapy delivery

RTM was delivered in between 2 to 4 90–120-minute sessions over a 3-week period from first to final session, requiring at least one sleep cycle between sessions. As is standard practice for TF-CBT, therapy was delivered in up to 18 60–90-minute weekly sessions over an 18-week period from first to final session.

2.4 Data collection and outcomes

Data collection took place at baseline (Time (T) 1), and weeks six (T2), twelve (T3) and 20 (T4) post randomisation. Questionnaires were completed by post, telephone, or online using Qualtrics. Follow-up data was included if collected ten days before/after the expected time point. Participants were offered a £15.00 shopping voucher for returning each questionnaire. Data was entered onto the eCRF (electronic Case Report Form) database (Elsevier's MACRO software) hosted on KCL's CTU encrypted server.

2.4.1 Primary outcomes

Primary outcomes were feasibility related:

- Proportion recruited (the number who consented to enter the study over the number who were screened for the study)
- Proportion randomised (the number who were randomised to a treatment arm over the number who consented to enter the study)
- Proportion of drop out/research attrition (the number who left the study over those who were randomised to a treatment arm)
- Completeness of outcome data (the proportion of data which was complete at the 20-week outcome)

2.4.2 Secondary outcomes

Mental health outcomes were measured by using six scales (Table 2): the PCL-5, the Work and Social Adjustment Scale (WSAS), the Quality of Process of Recovery scale (QPR), the Patient Health Questionnaire (PHQ-9), the Generalised Anxiety Disorder scale (GAD-7), and the EuroQuol-Visual Analogue Scale (EQ-VAS). Each measure has a minimal clinically important difference (MCID) representing the smallest improvement which is meaningful to the patient and was used as a threshold with a comparison of scores between baseline and 20-weeks. Mental health outcome data was used to determine a sample size calculation for an efficacy trial.

Table 2. Mental health outcome measures and MCID

Measure	Describes	Minimal Clinically Important Difference (MCID)
PCL-5	PTSD symptoms; >33 for PTSD	Reduction of 10 or more points
WSAS	Impact of mental health on life; higher score indicative of recovery	Reduction of 8 or more points
QPR	Mental health recovery; higher score indicative of recovery	N/A
PHQ-9	Depression; higher score indicative of depression	Reduction of 5 or more points
GAD-7	Anxiety; 5/10/15 points indicate mild/moderate/severe anxiety	Reduction of 6 or more points

EQ-VAS	Perceived health status; higher scores indicative of better perceived health	N/A

2.4.3 Statistical methods

Proportions were estimated for primary feasibility outcomes (with a 95% confidence interval (CI)) alongside the raw count. Analysis of the secondary outcomes aimed to define the difference in mean scores and standard deviations for the six mental health measures between baseline and 20-weeks.

2.4.4 Progression criteria to an efficacy trial

During the application stage, criteria to proceed to an efficacy trial were agreed with the funder according to trial criteria and strategic funding objectives (Table 3).

Table 3. Pre-specified progression criteria to an efficacy trial

Project Outcomes	Measure of Success	# of participants
Outcome 1: Known rate of trial recruitment, retention in treatment and research	Identify 180 eligible participants in 14 months	180 study participants
	Consenting and randomised participants n = 60	60 study participants
	RTM treatment drop out ≤ 30% TF-CBT treatment drop out ≤ 50%	≥36 study participants
	Research retention: 36 participants at 20 weeks	36 study participants
Outcome 2: Quality of outcome data	Baseline data complete for 90% of participants	54 study participants
	12-week data complete for 70% of participants	42 study participants
	20-week data complete for 50% of participants	30 study participants
Outcome 3: Known safety risks and ameliorations of RTM therapy	Adverse and serious adverse events and ameliorations recorded and discussed at bi-weekly research team meeting.	All 60 trial participants
	A log of every adverse, serious adverse event and clinical and research team actions in response	All 60 trial participants
Outcome 4: Establishment of expanded mental health care capacity in the veteran third sector	A minimum of 5 Inspire therapists will complete the 20-hour training and be assessed as competent in delivering protocoled TF-CBT	Ten Inspire therapists demonstrating competence in new therapeutic protocols and retained
	A minimum of 5 different Inspire therapists will complete RTM training and be assessed as competent in delivering the RTM protocol	
	Therapists attend 2-4 weekly clinical supervision sessions	All therapists

2.5 Qualitative Study

The qualitative semi-structured interviews aimed to: i) explore veterans' experiences of joining the PETT Study, ii) their experiences of research procedures and therapy, and iii) their views on how to improve the research design for future studies with this population. These interviews were used to supplement and add depth and nuance to the trial results and were conducted online due to the COVID-19 pandemic. Participants were eligible to participate in the interviews after 20 weeks follow-up was completed.

An interview guide was developed by the research team with a four-part structure aligned to the qualitative objectives with a focus on participants' experiences of joining/participating in the study, any challenges they encountered, and their thoughts on how to improve the research procedures. Participants were recruited via email following return of their 20-week questionnaire and through the project's participant newsletter. Interviews were conducted over the online meeting platform Zoom and ran for 40-60 minutes. There were no adverse events during the interviews, but veterans were provided with emergency support contact details if needed after the interview. Interview audio recordings were saved to a KCL password protected laptop, transcribed by two team members using the Microsoft Word transcription function, then deleted.

Transcripts were analysed using Braun & Clarke's (2012) six-step thematic analysis approach to identify patterns of meaning. Initial codes were generated and validated in coding teams and applied to remaining transcripts. A thematic map was created to visually collate the codes under meaningful themes with names and definitions.

3.0 Results

3.1 Quantitative Results

Between February 2020 and June 2021, N=100 participants were recruited (N=75 through the social media campaign) with N=60 being eligible and consenting to randomisation (full CONSORT diagram in Appendix 2). National characteristics of recruited and randomised participants are described in Table 4 below. The sample had a mean age of 53 years; 55 were male, 56 were white British, 24 were not working and 40 were in a long-term relationship. All ranks and services were represented with greater proportions from the lower ranks; 46 had served for 5 or more years (with a third (20) having served > 13 years) and 30 had been deployed overseas three or more times. The mean baseline PCL-5 score was 57; 50 had CPTSD and 39 had experienced four or more traumas (Table 5).

Table 4: National characteristics of randomised participants

	N=
England	31
Scotland	8
Wales	3
Northern Ireland	15
Unknown	3
TOTAL	**60**

Table 5. Participant characteristics (overall and by arm)

Characteristics	**TF-CBT** (n= 25)	**RTM** (n= 35)	**Total** (n= 60)
Age (yrs), *mean (SD)*	53.56 (11.79)	52.66 (8.01)	53.03 (9.68)
Age (yrs), *median (IQR)*	54 (46, 62)	52 (47, 57)	52 (46.5, 58.5)
Sex, *n (%)*			
Male	22 (88.00)	33 (94.29)	55 (91.67)
Female	3 (12.00)	2 (5.71)	5 (8.33)
Ethnicity, *n (%)*			
White	22 (88.00)	34 (97.14)	56 (93.33)
Any other ethnic group	1 (4.00)	1 (2.86)	2 (3.33)
Missing	2 (8.00)	0 (0.00)	2 (3.33)
Occupational Status last 30 days, *n (%)*			
No paid work	10 (40.00)	14 (40.00)	24 (40.00)
Part-time paid work	2 (8.00)	6 (17.14)	8 (13.33)
Full time paid work	11 (44.00)	15 (42.86)	26 (43.33)
Missing	2 (8.00)	0 (0.00)	2 (3.33)
Relationship Status, *n (%)*			
Long term relationship/ married	13 (52.00)	27 (77.14)	40 (66.67)
Short term relationship	3 (12.00)	0 (0.00)	3 (5.00)
Not in a relationship	7 (28.00)	8 (22.86)	15 (25.00)
Missing	2 (8.00)	0 (0.00)	2 (3.33)
Living alone, *n(%)*			

No	14 (56.00)	24 (68.57)	38 (68.57)
Yes	8 (32.00)	10 (28.57)	18 (30.00)
Missing	3 (12.00)	1 (2.86)	4 (6.67)
Armed Forces composition, *n (%)*			
Royal Navy	0 (0.00)	1 (2.86)	1 (1.67)
British Army	22 (88.00)	28 (80.00)	50 (83.33)
Royal Marines	0 (0.00)	2 (5.71)	2 (3.33)
Royal Airforce	1 (4.00)	3 (8.57)	4 (6.66)
Missing	2 (8.00)	1 (2.86)	3 (5.00
Rank on military exit, *n (%)*			
Lower rank (Pte to Cpl)	15 (60.00)	16 (45.71)	31 (51.67)
Senior rank (Sgt to WO1)	6 (24.00)	16 (45.71)	22 (36.67))
Officer rank	2 (8.00)	2 (5.71)	4 (6.67)
Missing	2 (8.00)	1 (2.86)	3 (5.00)
Duration of Military Service, *n (%)*			
≤4 years	4 (16.00)	8 (23.86)	13 (20.00)
5-12 years	10 (40.00)	7 (20.00)	17 (28.33)
≥13 years	9 (36.00)	20 (57.14)	29 (48.33)
Missing	2 (8.00)	0 (0.00)	2 (3.33)
Times deployed overseas for 30 days or more, *n (%)*			
≤2 times	12 (48.00)	16 (45.72)	28 (46.67)
3-5 times	7 (28.00)	9 (25.71)	16 (26.67)
More than 5 times	4 (16.00)	10 (28.57)	14 (23.33)
Missing	2 (8.00)	0 (0.00)	2 (3.33)
Eligible diagnosis, *n (%)*			
PTSD	3 (12.00)	6 (17.14)	9 (15.00)
Complex PTSD	22 (88.00)	28 (80.00)	50 (83.33)
Incorrectly Returned	0 (0.00)	1 (2.86)	1 (1.67)
Number of previous traumas, *n (%)*			
1 previous trauma	1 (4.00)	2 (5.71)	3 (5.00)
2-3 previous traumas	8 (32.00)	8 (22.86)	16 (26.67)
4-6 previous traumas	5 (20.00)	12 (34.29)	17 (28.33)
≥7	10 (40.00)	12 (34.29)	22 (36.67)
Missing	1 (4.00)	1 (2.86)	2 (3.33)
Number of previous treatment attempts, *n (%)*			
0 attempts	5 (20.00)	4 (11.43)	9 (15.00)
1-3 attempts	9 (36.00)	24 (68.57)	43 (55.00)
4-6 attempts	7 (28.00)	5 (14.29)	12 (20.00)
≥7 attempts	4 (16.00)	1 (2.86)	5 (8.34)
Missing	0 (0.00)	1 (2.86)	1 (1.67)
PTSD onset and diagnosis			
Time since PTSD onset (yrs), *mean (SD)*	17.92 (7.53)	13.10 (9.87)	15.29 (9.13)
Time since confirmed PTSD diagnosis (yrs), *mean (SD)*	11.38 (7.57)	7.37 (5.68)	8.88 (6.67)
Baseline questionnaire, Mean (SD)			
PCL-5 score	54.88 (10.84)	58.47 (10.62)	56.95 (10.77)

WSAS score	25.28 (8.82)	23.92(7.88)	24.48 (8.24)
EQ VAS Score	48.92 (23.71)	50.80 (19.28)	50.02 (21.07)
PHQ 9 score	19.39 (5.70)	18.48 (5.88)	18.86 (5.78)
GAD 7 score	15.55 (4.63)	15.45 (4.45)	15.55 (4.63)
QPR score	43.72 (10.20)	44.46 (11.90)	44.15 (11.14)

3.1.1 Feasibility outcomes

All the pre-ordained progression criteria were met (Table 5). The only criteria not fully met related to therapy compliance, as the 50% threshold for TF-CBT was achieved but RTM was almost 5% short of the 70% threshold (i.e. an additional 5% (2 participants) completing RTM treatment were required to meet the 70% minimum threshold). These criteria differed by group because of the published attrition rates for these therapies. During the trial, two further criteria were identified: 1) assessed as ineligible by the therapist and 2) not commencing therapy post randomisation.

Table 6. Primary feasibility outcomes using the traffic light system to progression to full trial

Outcome* %, (95% CI)	**Progression criteria**	**TF-CBT (n = 25)**	**RTM (n = 35)**	**Overall (n = 60)**
Proportion recruited (Participants Recruited/participants Approached)	180 expressing interest	-	-	75 (65.48, 82.59)
Proportion randomised (Randomised/Recruited)	60	-	-	80 (69.23, 87.67)
Proportion of participants lost to follow up	≤40%	12.00 (3.69, 32.69)	5.71 (1.36, 21.02)	8.38 (3.45, 18.80)
Proportion of participants deemed unsuitable for therapy by therapist	New criteria	20.00 (8.18, 41.23)	5.71 (1.36, 21.02)	11.67 (5.58, 22.80)
Proportion of participants who did not commence therapy	New criteria	12.00 (3.69, 32.69)	11.43 (4.20, 27.53)	11.67 (5.58, 22.80)
Completeness of all outcome data for all randomised patients, (Missing data point/All data points at 20 weeks)	≥60%	64.00 (42.93, 80.77)	82.86 (66.02, 92.32)	75 (62.29, 84.49)
Completeness of PCL-5 outcome at 20 weeks	≥60%	64.00 (42.93, 80.77)	82.86 (66.02, 92.32)	75 (62.29, 84.49)
Compliance with therapy	RTM ≥70% TF-CBT ≥50%	52.00 (32.17, 71.22)	65.71 (48.17, 79.81)	60.00 (46.96, 71.76)

*Measures are the rate as a percentage (denominator stated in table), (95% confidence interval).

3.1.2 Secondary outcomes

Sixteen participants out of 25 completed outcome data at 20-weeks in the TF-CBT arm, and 29 participants out of 35 completed outcome data at 20-weeks in the RTM arm (Table 6). One participant in the RTM arm did not provide baseline data and thus their 20-week data was not included

in the outcome analysis. Participants in the RTM arm experienced a mean reduction of 18 points on the PCL-5 compared to an 8-point reduction in the TF-CBT arm. More RTM participants experienced a minimal clinically important difference (MCID) in PTSD symptoms (48%) than in the TF-CBT arm (16%), however the standard deviations were large in both arms meaning there was great variability in PTSD outcomes experienced by individual participants within each therapy arm. Despite the reduction in PCL-5 scores in both arms, the mean PCL-5 remained above the PTSD diagnostic threshold of 33 meaning they would still be diagnosed as having PTSD. Functional impairment, assessed by the WSAS, reduced in both groups though a larger effect was seen in the RTM arm (RTM = -4.62, TF-CBT = -3.06). Depression symptoms assessed by the PHQ-9 reduced across both arms (RTM = -2.73, TF-CBT = -3.07), meeting the MCID of -1.7. This reduction in the MCID was also seen in anxiety assessed by the GAD-7. Health status and quality in the process of recovery improved in the RTM group only.

Table 7. Analysis of mental health outcomes by treatment arm

Outcome	**At 20-weeks**		**Mean change from baseline**	
Questionnaire	**TF-CBT** (n= 16)	**RTM** (n= 29)	**TF-CBT** (n= 16)	**RTM** (n= 29)
PCL-5, mean (SD)	48.31 (11.98)	38.17 (17.70)	-8.38 (14.32)	-17.71 (21.22)
MCID* *% (95% CI)*	16.00 (5.82, 37.00)	48.47 (32.30, 65.25)	-	-
WSAS, mean (SD)	23.00 (9.61)	19.07 (11.50)	-3.06 (8.23)	-4.62 (9.16)
MCID* *% (95% CI)*	24.00 (10.72, 45.36)	25.71 (13.62, 43.17)	-	-
PHQ-9, mean (SD)	17.25 (4.80)	15.18 (7.51)	-3.07 (6.13)	-2.73 (6.80)
MCID* *% (95% CI)*	24.00 (10.72, 45.36)	20.00 (9.58, 37.11)	-	-
GAD-7, mean (SD)	13.50 (4.12)	11.82 (6.09)	-3.43 (6.31)	-3.11 (6.25)
MCID* *% (95% CI)*	24.00 (10.72, 45.35)	22.86 (11.56, 40.17)	-	-
QPR, mean (SD)	42.94 (9.56)	46.76 (13.14)	-2.38 (11.68)	1.66 (14.11)
EQ VAS, mean (SD)	50.06 (21.94)	57.14 (25.15)	0.06 (31.50)	5.66 (26.74)

* percentage of participants that met the MCID

3.1.3 Safety outcomes

There were no adverse events reported in this trial. No participants met the safety criteria threshold relating to PCL-5 changes between sessions or from baseline to session. The independent clinical psychologist received no contacts from participants or family members in the RTM arm.

3.2 Qualitative Results

Fifteen veterans participated in the participant interviews (Table 7, below).

3.2.2 Participant qualitative interviews

Table 8. Qualitative interviews by treatment and completion

Interview Group	**N**

RTM – completed treatment	6
RTM – stopped treatment	2
TF-CBT – completed treatment	5
TF-CBT – stopped treatment	2
TOTAL	**15**

The interview schedule covered six domains, with multiple themes and sub-themes emerging during data analysis (Table 8).

Table 9. Qualitative findings by domain, theme, and sub-theme

Domain	Themes	Sub-themes
Experiences of joining a research project	Recruitment	--
	Motivational Factors	*Get Better*
		"One For All"
		Care Provision
		Trust
	Provided Information	--
	Treatment Allocation	*Treatment Preferences*
		Treatment Provision
		Treatment Concerns
Experiences of being a research participant	Positive Experience	*Communication & relationships*
		Desire to Participate & Engagement
		Sharing
		Assessments
Experiences of therapy	Positive Outcomes	*Behavioural Impacts*
		Mental Health Impacts
		Social & Family Impacts
	Online Therapy Delivery	*What Worked Well*
		Challenges
	Face-to-face Delivery	--
Then & Now	Where I Am	*Subconscious Improvement*
		Continuing Improvement
	RTM Mechanisms	*Breaking The Circle*
	RTM or TF-CBT	*Previous Treatment Experiences*
		My Toolbox
Why Didn't It Work?	Challenges With Therapy	*Triggering Symptoms*
		Long Sessions
Future Recommendations	Research	*Marketing*
		Recruitment & Retention
		Assessments
	Therapy	*Information*
		Structure
		Provision
	Military Culture	--
	What Is Next For Us?	--

3.2.3 Domains, themes, and sub-themes

Domain 1: Experiences of joining a research programme

Several themes (bold) and sub-themes (italics) were identified in this Domain: **Recruitment**, **Motivational Factors** (*Get Better, "One For All", Care Provision,* and *Trust*), **Provided Information**, and **Treatment Allocation** (*Treatment Preferences, Treatment Provision,* and *Treatment Concerns*). All but one participant joined the study via the stated recruitment pathways. Motivations were to improve their health, to do something for the veteran community and to improve care. All participants talked about gaining trust as they were recruited and that this trust was affirmed with study materials and engagement with the team.

> *"I was a bit apprehensive to start with. But as I got into it, I became more relaxed […] but I was made to feel relaxed and once I got into the programme, I became more confident and was able to talk more openly." (Interviewee 3, TF-CBT)*

Participants did not have a treatment preference so long as support was provided to improve their PTSD symptomatology, as their main concern was receiving treatment. Veterans expressed no concerns that the therapy was provided by a charity and some voiced a preference for and confidence with treatment via a charity.

> *"I was actually quite upbeat and excited about it. I was like, I really hope this can do something that CBT and EMDR haven't, uh, so, yeah. I was quite excited at that point when I heard what I was going to be doing." (Interviewee 10, RTM)*

Domain 2: Experiences of being a research participant

One theme with multiple sub-themes was identified for this Domain: **Positive Experiences** (*Communication & Relationships, Desire to Participate & Engagement, Sharing,* and *Assessments*). All participants reported positive experiences. Remaining a participant in the study, even if they did not think that they were benefitting from the treatment, was very important and aligned with their military culture and training. Participants felt that they were given the time and space to formulate a relationship with their therapists and understood the importance of a therapeutic alliance.

> *"At times it was emotional having to sort of revisit these memories, but it was a process I knew had to be done if I wanted to try to sort some of them out, so it was worth suffering a little bit to move on." (Interviewee 4, RTM)*

While most participants understood the need to complete the assessment measures, some expressed their curiosity in relation to assessment scores and score improvements after therapy and others retrospectively questioned their responses.

Domain 3: Experiences of Therapy

Several themes and multiple sub-themes were identified in this Domain: **Positive Outcomes** (*Behavioural Impacts, Mental Health Impacts,* and *Social & Family Impacts*), **Online Therapy Delivery** (*What Worked Well* and *Challenges*), and **Face-to-face Delivery**. Almost all participants noticed that their symptoms reduced, they were able to put words to their condition, and their ability to handle stress increased.

> *"My wife has noticed that I'm not as snappy as I used to be, and I'm definitely thinking a lot more about how I'm reacting to certain things." (Interviewee 10, RTM)*

Disentangling experiences of therapy and therapy specifically within a research setting was difficult. Participants discussed key challenges related to each treatment method that either influenced their willingness to continue with the treatment or challenged their ability to grasp the mechanisms of the method so as to apply it effectively. The long treatment duration for TF-CBT was a struggle while for RTM, visualisation was a key challenge. In fact, visualisation challenges were the main factor in withdrawals from therapy for the RTM treatment group. A few participants also discussed how both therapies triggered PTSD symptoms and led to withdrawal from therapy.

Domain 4: Then and now

Three themes and multiple sub-themes were identified in this Domain: **Where I Am** (*Subconscious Improvement* and *Continuing Improvement*), **RTM Mechanisms** (*Breaking the Circle*), and **RTM or TF-CBT** (*Previous Treatment Experiences* and *My Toolbox*). Participants discussed the changes they have noticed between starting and completing treatment. Almost all participants noticed that their symptoms reduced, that they were able to put words to their condition and their ability to handle stress increased, while some spoke of coming to understanding where things 'went wrong' in their emotional processing of trauma. Speaking of the insight they gained from treatment, participants reported picking up a few 'tools' they are still using.

> *"And then it might be for example on the Facebook group, somebody pops up and says, well, so-and-so was dead. And so-and-so was younger than me and he's killed himself. You know what I mean? So things like that will trigger me. But then just being able to sit there and say, you know. I'm here, I've got my wife. I've got my three kids. I've got the grandson. I've got 1,032 kids at school who loved me. You know what I mean?" (Interviewee 15, TF-CBT Group)*

Domain 5: Why didn't it work?

One theme with two sub-themes, **Challenges** (*Triggering Symptoms* and *Long Sessions*) was identified. When asked what did not work for them and why, many participants elaborated on the challenges explored in Domain 4, stating that treatment had triggered some PTSD symptoms, and that the long sessions of TF-CBT could be difficult to get through while visualisation was an issue for some RTM participants.

Domain 6: Future Recommendations

Several themes and nested sub-themes were identified in this Domain: **Research** (*Marketing, Recruitment & Retention,* and *Assessments*), **Therapy** (*Information, Structure,* and *Provision*), **Military Culture**, and **What's Next For Us?**.

Regarding research recruitment, participants advocated for multiple channels including veteran-specific organisations and charities, veteran communities, and social media platforms such as Facebook and Twitter. The need to identify pathways that will allow 'hard to reach' veterans to participate was highlighted. Recommendations by their ex-commanders could be important, though veteran-only strategies might deter some who associate this with secrecy and have a lack of trust in the system. Participants stressed that retention was influenced by the outcome of the first session and connection with their therapists.

"I think this is a big challenge because what you're talking about is sort of how we integrate studies into the wider network. So think about how people get uh, sort of visibility in the veterans community. There is no consistent method. You've got Veterans UK, which is a shambles. You've got local networks. You've got charities. I think for me the biggest thing will be reaching out through the different networks." (Interviewee 12, RTM)

Participants argued that the therapy structure should be personalised to meet people's needs and time should be provided to adjust and effectively use therapy techniques such as visualisation and working with a smaller 'chunk' of trauma at a time. Online therapy was the only mode available consequent to the pandemic and most found this acceptable and in many cases desirable. A few veterans indicated that client preference for online or face-to-face might be important.

"They're dealing with quite a lot in one go, so maybe instead of breaking it down into three parts, maybe breaking it down into five or six, just taking smaller parts of it and then dealing with that as a whole rather than, you know, just I will take this chunk to hear this chunk to hear [...] It's too large a chunk in one go." (interviewee 10, RTM)

Prior understanding of military culture/life and sharing the same cultural context was reported as vital for a positive therapy experience for veterans, and participants shared that it was vital for their therapy, engagement, and communication. Several highlighted that an understanding of military ranks, hierarchical relationships within the military forces, and the military system would positively impact processes for recruitment, participation and retention, outcomes, and engagement with therapy.

"He was Irish and he knew places where I was talking about. That helped, I think, and he understood what life was like at that time out there, and I think that helps." (Interviewee 11, RTM)

Participants had views on the summation of their experiences with the research team and project. They wanted their own outcomes to be communicated with their GPs/the NHS so these treatment outcomes could be used in their future care planning. Many stated it was also important to them to understand what would happen next in the research project, that they felt it validated their contribution.

4.0 Discussion

4.1 Principle findings

4.1.1 Feasibility of the trial protocol

The findings, and the quality of the data generated, show that the trial protocol was one suitable to evaluate the efficacy of RTM as a potential treatment for PTSD. Within the specified pre-trial progression criteria, the trial established that: i) it is feasible to recruit veterans into a therapy trial, ii) they will consent to randomisation into two different therapies and iii) they will remain in therapy and engaged with the research. Furthermore, follow-up interviews with veterans found both research therapies, and study procedures, were acceptable to participants who described overall positive experiences of taking part in the trial.

Two additional progression criteria were developed during the trial, '*the proportion of participants deemed unsuitable for therapy by therapist*' and '*the proportion of participants who did not commence therapy*'. The percentage of participants who did not present for their therapy appointments was the same in both arms at 11%. The percentage of those deemed unsuitable for therapy by their therapist differed between groups, with 20% in the TF-CBT arm compared to only 5% in the RTM. Patient and public involvement discussions with the therapists and clinical supervisors have identified likely reasons for these 'participant suitability' differences as relating to:

- disrupted initial training for the TF-CBT therapists
- insufficient training provided for the clinical psychologists in undertaking the CAPS-5 assessment
- an over reliance on the CAPS-5 to determine trial eligibility

This indicates the protocol requires strengthening before it is used in the next stage of research in a definitive RCT. This strengthening will determine the potential participants' therapy readiness alongside therapist, or therapy-related factors.

4.1.2 RTM efficacy

An 'efficacy signal', a statistical indication of clinical efficacy, was detected for RTM in veterans with complex PTSD, showing an 18-point reduction in PTSD symptoms at 20-weeks following RTM therapy. This signal exceeds the established minimal clinically important difference (MCID) of a 10-point symptom reduction on the PCL-5 (Stefanovics et al., 2018). The efficacy signal for TF-CBT, with an 8-point reduction, fell slightly short of the MCID. Despite the reduction in PCL-5 scores, the mean PCL-5 score remained above the threshold (in both arms) for losing a diagnosis of PTSD which is a score of 33 or above (Weathers et al., 2013). A further mean reduction of 5 points would be required for all participants to have lost their PTSD diagnosis. This may be due to the complex PTSD diagnoses of most of the participants. Nonetheless, the study identified a significant and important degree of symptom reduction and 48% of the RTM arm did lose their PTSD diagnosis compared to 16% in the TF-CBT arm. Such an outcome is likely to be important for a participant population for whom over 65% have experienced four or more traumas.

Importantly, neither RTM therapy nor TF-CBT resulted in an adverse or serious adverse event(s). The safety protocol defined both adverse and severe adverse events and none were reported by the participants, the clinical providers or by the independent clinical psychologist.

4.2 Strengths and limitations

4.2.1 Recruitment challenges

Recruitment challenges were significant but ultimately resolvable. The COVID-19 pandemic began four weeks after the study launch, negatively impacting recruitment pathways and overall recruitment, however the steps taken in response seemed to have broadened the feasibility of the trial. The initial focus on NI was due to high levels of trauma exposure resulting from The Troubles (Armour, McGlinchey, & Ross, 2021) and the location of a charity-sector clinical provider with robust clinical, information, and financial governance. The decision to widen recruitment from NI veterans to all UK veterans established that a broader pool of veterans is interested in participation and that therapy delivery from a different geographical region (i.e. therapists and participants with different regional accents) is acceptable.

The move to broaden recruitment and recruit through a focused and funded social media campaign resulted in a significant interest in participation. The team was able to learn from this experience, developing objective evidence confirming the organic and supportive nature of communications between veterans, their families, and communities, and the recruitment targets were achieved within the revised timeframes.

4.2.2 Online therapy delivery

Online therapy delivery became necessary but proved acceptable to participants and was ultimately feasible. The initial and ongoing COVID-19 lockdowns meant that in-person attendance at health appointments were not possible and the newly trained RTM and TF-CBT therapists were inexperienced in online therapy delivery. While there is some evidence supporting online delivery for TF-CBT (Stewart et al., 2017; Stewart et al., 2020), RTM had never been delivered virtually. RTM safety was a research concern and delivery online held further implications for the safety protocol, which required adaption. Following a number of adjustments across these areas, online delivery of both therapies rapidly became the sole form of delivery. This changed the research intervention from an evaluation of RTM to an evaluation of online RTM.

The finding that this method of delivery could result in the RTM group exceeding the MCID in PTSD symptoms holds significance for the feasible and cost-effective delivery of RTM to multiple populations in the future, if efficacy evidence is established in a larger scale effectiveness RCT.

4.3 Impact and implications

The findings of this trial are promising. We identified that the recruitment process was generally robust and the preliminary results suggest that RTM may be an effective intervention deliverable over far fewer sessions than TF-CBT. However, our outcome results are provisional because of the nature of the trial, and further research is required before firm recommendations for, or indeed against, the use of online RTM can be provided. Importantly, trial participants in both arms experienced improvements in PTSD symptoms and no safety concerns were observed. Our findings which indicate that RTM delivered online is acceptable to veterans nonetheless builds on published US studies (Gray & Teall, 2016; Tylee et al., 2017; Gray, Budden-Potts, & Bourke, 2017; Gray et al., 2021) and demonstrates promising results which require evaluation in a definitive randomised controlled trial (RCT).

The research protocol was designed to establish safety and feasibility. Additional elements developed throughout the feasibility trial to strengthen it should be used to underpin a next stage efficacy trial. It is expected that further research into RTM therapeutic efficacy would have significant implications for policy, practice, and research.

4.4 Conclusions and next steps

RTM therapy remains a promising psychological intervention for the treatment of PTSD and complex PTSD in military veterans. While this trial was able to successfully train charity counsellors in the use of RTM (specifically online RTM delivery) a future research step would include establishing the feasibility of training NHS healthcare workers in RTM delivery. As the number of sessions needed for RTM is lower than that for TF-CBT, and the therapy has shown promise in veteran populations, RTM use in the NHS could help alleviate some of the institutional barriers to seeking care by being more cost-effective. Should RTM ultimately prove as effective as TF-CBT and/or EMDR, it may lead to an additional option of care for those whose PTSD symptoms are severe or appear resistant to other therapies.

The research protocol, strengthened in areas of participant therapy readiness, should be used to underpin further evaluation. The PETT Study has joined the growing body of literature supporting the RTM protocol as feasible in a variety of settings with differing populations. While testing has necessitated changes due to specific circumstances (e.g. COVID-19) and conditions (online delivery, etc.), these changes will result in overall better studies and quality data.

A fully powered trial is the next appropriate step to determine the efficacy of RTM and its safe use with UK veterans. The research team is currently taking steps to apply for a grant supporting a fully powered, large population randomised controlled trial exploring the efficacy of RTM as a treatment for PTSD in veterans. This trial will be informed by the lessons and experiences of this PETT Study in the hopes of establishing a methodologically sound, replicable exploration of efficacy.

References

Armour, C., McGlinchey, E., Ross, R. (2021). *The health and wellbeing of armed forces veterans in Northern Ireland: the results of a cross-sectional psychological wellbeing survey*. Available from: https://nivso.org.uk/wp-content/uploads/2021/04/NI-Veterans-Health-Wellbeing-Study-Psychological-Wellbeing-Survey-Report.pdf.

Armour, C., Walker, E., Waterhouse-Bradley, B., Hall, M., & Ross, J. (2017). *Current and future needs of veterans in Northern Ireland*. Retrieved October 20, from: https://www.fim-trust.org/wp-content/uploads/current-future-needs-veterans-northern-ireland.pdf.

Braun, V., & Clarke, V. (2012). Thematic analysis. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, Vol. 2. Research designs: Quantitative, qualitative, neuropsychological, and biological* (pp. 57–71). American Psychological Association.

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy*, 38(4), 319-345. DOI: 10.1016/s0005-7967(99)00123-0

Eldridge, S. M., Chan, C. L., Campbell, M. J., Bond, C. M., Hopewell S, Thabane L, & Lancaster, G. A. (2016). CONSORT 2010 statement: extension to randomised pilot and feasibility trials. *British Medical Journal*, 355, i5239. DOI: 10.1136/bmj.i5239

Fear, N. T., et al. (2014). *Chapter 4: Posttraumatic stress disorder*. In: McManus S et al (eds) Mental health and wellbeing in England: Adult psychiatric morbidity survey 2014. NHS Digital, Leeds.

Gray, R. M., & Bourke, F. F. (2015). Remediation of intrusive symptoms of PTSD in fewer than five sessions: a 30-person pre-pilot study of the RTM Protocol. *Journal of Military, Veteran and Family Health*, 1(2), 13-20. DOI: 10.3138/jmvfh.2996

Gray, R. M., Teall, B. (2016). Reconsolidation of Traumatic Memories (RTM) for PTSD - a case series. *Journal of Experimental Psychotherapy*, 19(4), 59-69.

Gray, R. M., Budden-Potts, D., & Bourke, F. F. (2017). The Reconsolidation of Traumatic Memories (RTM) Protocol for PTSD: a case study. *Journal of Experimental Psychotherapy*, 20(4), 47-61.

Gray, R. M., Budden-Potts, D., Schwall, R. J., & Bourke, F. F. (2021). An open-label, randomized controlled trial of the reconsolidation of traumatic memories protocol (RTM) in military women. *Psychological Trauma: Theory, Research, Practice, and Policy*, 13(6), 641-651. DOI: 10.1037/tra0000986

Hasan, S., & Bashford, J. (2017). *Call to mind: Northern Ireland: Findings from the review of veterans' and their families' mental and related needs in Northern Ireland*. Available from: https://s31949.pcdn.co/wp-content/uploads/call-to-mind-northern-ireland-review-veterans-families-mental-health-needs.pdf.

Kar, N. (2011). Cognitive behavioral therapy for the treatment of post-traumatic stress disorder: a review. *Neuropsychiatric Disease and Treatment*, 7, 167. DOI: 10.2147/NDT.S10389

Kindt, M., & Soeter, M. (2013). Reconsolidation in a human fear conditioning study: A test of extinction as updating mechanism. *Biological Psychology*, 92(1), 43–50.

King's Centre for Military Health Research. (2022). *The mental health of the UK armed forces (March 2022 version)*. Retrieved from: https://kcmhr.org/key-facts/

National Institute of Health and Care Excellence, *Evidence reviews for psychological, psychosocial and other non-pharmacological interventions for the treatment of PTSD in adults*. 2018

Rafferty, L., Stevelink, S., Greenberg, N., & Wessely, S. (2017). *Stigma and barriers to care in service leavers with mental health problems*. Retrieved from: https://www.fim-trust.org/wp-content/uploads/stigma-barriers-care-service-leavers-mental-health-problems.pdf.

Roberts J, Lenton P, Keetharuth AD, Brazier J. Quality of life impact of mental health conditions in England: results from the adult psychiatric morbidity surveys. Health and quality of life outcomes. 2014 Dec;12(1):1-0.

Schiller, D., & Phelps, E. A. (2011). Does reconsolidation occur in humans? *Frontiers in Behavioral Neuroscience*, 5, Article 24.

Stefanovics, E. A., Rosenheck, R. A., Jones, K. M., Huang, G., & Krystal, J. H. (2018). Minimal clinically important differences (MCID) in assessing outcomes of post-traumatic stress disorder. *The Psychiatric Quarterly*, 89(1), 141–155. DOI: 10.1007/s11126-017-9522-y

Stevelink SA, Jones M, Hull L, Pernet D, MacCrimmon S, Goodwin L, MacManus D, Murphy D, Jones N, Greenberg N, Rona RJ. Mental health outcomes at the end of the British involvement in the Iraq and Afghanistan conflicts: a cohort study. The British Journal of Psychiatry. 2018 Dec;213(6):690-7.

Stewart, R. W., Orengo-Aguayo, R. E., Cohen, J. A., Mannarino, A. P., & de Arellano, M. A. (2017). A pilot study of trauma-focused cognitive–behavioral therapy delivered via Telehealth technology. *Child Maltreatment*, 22(4), 324-333. DOI: 10.1177/1077559517725403

Stewart, R. W., Orengo-Aguayo, R., Young, J., Wallace, M. M., Cohen, J. A., Mannarino, A. P., & de Arellano, M. A. (2020). Feasibility and effectiveness of a telehealth service delivery model for treating childhood posttraumatic stress: A community-based, open pilot trial of trauma-focused cognitive–behavioral therapy. *Journal of Psychotherapy Integration*, 30(2), 274–289.

Sturt, J., Ali, S., Robertson, W., Metcalfe, D., Grove, A., Bourne, C., & Bridle, C. (2012). Neurolinguistic programming: a systematic review of the effects on health outcomes. *British Journal of General Practice*, 62(604), e757-e764. DOI: 10.3399/bjgp12X658287

Teare, M. D., Dimairo, M., Shephard, N., Hayman, A., Whitehead, A., & Walters, S. J. (2014). Sample size requirements to estimate key design parameters from external pilot randomised controlled trials: a simulation study. *Trials*, 15(1), 1-13. DOI: 10.1186/1745-6215-15-264

Tylee, D. S., Gray, R. M., Glatt, S. J., & Bourke, F. F. (2017). Evaluation of the reconsolidation of traumatic memories protocol for the treatment of PTSD: a randomized, wait-list-controlled trial. *Journal of Military, Veteran and Family Health*, 3(1), 21-33. DOI: 10.3138/jmvfh.4120

Weathers, F.W., Litz, B.T., Keane, T.M., Palmieri, P.A., Marx, B.P., & Schnurr, P.P. (2013*). The PTSD Checklist for DSM-5 (PCL-5)*. Scale available from the National Center for PTSD at www.ptsd.va.gov.

Appendix 1 – Participant Safeguarding Protocol

Our experimental therapy, RTM protocol, has been delivered without serious adverse event in five USA studies involving over 120 veterans (28, 31-33, 53). Nonetheless, it is important to have a robust safety protocol for this vulnerable group of UK participants for its first exposure to a UK population. The following comprises our safety protocol for all participants in the trial, throughout the trial, and specifically for all participants randomised to the experimental RTM group. It addresses lines of responsibility and accountability, definitions relating to safety, escalation and safeguarding procedures in the event of notable clinical deterioration with or without an escalation in risk, alongside ensuring the safe and effective management of participants who are ineligible to enter the trial.

1.0 Lines of responsibility and accountability

1.1 From the point at which a potential participant is handed over to Inspire for eligibility assessment through to the point of discharge, Inspire have responsibility and clinical governance accountability for the participant's mental health and wellbeing and including their own safety and where relevant the safety of others and including the safeguarding of children and vulnerable adults.

1.2 From the point of discharge from Inspire therapy to the point of 52 week follow, up or withdrawal from the trial, the participant's GP holds responsibility and accountability for the participant's mental health and wellbeing and this includes their safety.

1.3 Participant safety will be a standing agenda item on every fortnightly King's- QUB research team meeting.

1.4 Data Monitoring and Ethics Committee (DMEC) will meet four times during the trial comprising three trauma experts, a veteran welfare expert and an independent statistician. The DMEC terms of reference will operate according to the King's Clinical Trials Unit Standard Operating Procedures. The research team will report any participant safety issues to the DMEC within 48 hrs of each fortnightly King's and Queen's meeting.

2.0 Definitions related of safety

2.1 Mental health safety - symptom severity, deterioration is assessed using the PCL-5 self-report screening questionnaire (39, 67, 68) completed by the participant at the beginning of every therapy session until discharge. Any existing or emergent safeguarding and or vulnerable adult concern will be assessed and monitored at each session with proportionate action taken in accordance with legislative reporting requirements.

2.2 Mental health safety is assessed using the PCL-5 self-report screening questionnaire completed by the participant at the following time points following discharge; 6 weeks post randomisation which is likely to be post discharge in the RTM group and during therapy in the TF-CBT group; 12 weeks post randomisation; 20 weeks post randomisation and 52 weeks post randomisation.

2.2.1 The named researcher will review all incoming follow up PCL-5 scores within 72 hrs of receipt.

2.3 PTSD Adverse Events are defined as a ≥10 point rise in the self-report PCL-5 since the previous therapy session or a 15 point rise from baseline or the maximum score of 80 being reached and/or relapse into alcohol and/or substance misuse at a hazardous level

which integrated with the clinical judgement of the treating therapist will determine the action taken

2.4 PTSD Serious Adverse Events are defined as hospital admission for mental ill-health, self-harm, suicide and attempted or completed suicide.

3.0 Safety net procedures for between therapy and follow up time points

3.1 All participants will be offered a *Contact Card* at the point of randomisation. This will list the contact details of services to call 24/7 if they feel they need to talk with someone about their mental health outside of their therapy session and throughout their trial participation. Contact details will include Lifeline, Samaritans, their GP and where appropriate their Aftercare case worker and Inspire's 24/7 helpline.

3.1.1 For participants in therapy, the therapist will record participant self-reports of all contacts being made in the therapy safety log.

3.1.2 For participants in follow up, the researcher will note such self-reports in the data collected and ask the participant for details. Details, if provided, will be recorded in the researcher's participant safety log.

3.1.3 The unblinded researcher will review the therapy database weekly to determine if any activity has been logged in the previous 7 days.

3.2 The RTM therapy is experimental and, in contrast to TF-CBT, does not carry evidence of treatment effects and safety issues. Therefore an additional participant safety feature is provided for this group and their family members. An additional contact number for an Independent Clinical Psychologist (ICP) will be provided.

3.3 The ICP is funded for ½ an hour a week for any RTM participant or their family member to contact them by telephone with concerns for participant mental health safety and or vulnerable adult and or safeguarding concerns.

3.4 Where the ICP identifies a need to escalate their concern regarding either the mental health care or safeguarding and vulnerable adult of a participant and or their immediate family member they will take action themselves and encourage the participant to take action. These actions are specified as:

3.4.1 Advise the participant to make contact with their GP

3.4.2 Advise the participant to contact a family member

3.4.3 Where possible the ICP will speak with a family member to signpost them to the GP for escalation

3.4.4 The ICP will independently inform the participant's GP within 2 hours to alert them to the participant's need for mental health escalation and safeguarding.

3.4.5 If the participant is still in therapy they will inform and update the participant's Inspire therapist within a minimum of 24-hours and in advance of the next scheduled therapy session

3.4.5.1 The therapist will inform the named researcher

3.4.6 If the participant has completed or dropped out of therapy early (unplanned ending) with Inspire and are in follow-up they will inform the named researcher

3.4.7 They will keep a log of the incident, the clinical concerns noted and the actions taken.

3.4.8 The ICP will have weekly email contact with the named researcher to report any safety logs and or safeguarding concerns in the previous 7 days.

3.5 The ICP will have independent access to the Data Monitoring and Ethics Chair (DMEC) chair to whom they will report any serious adverse events.

4.0 Care escalation procedures in the case of adverse event

4.1 If at point of referral or during the course of treatment, Inspire therapists become concerned about the welfare of any participant or immediate family member they will escalate their concerns through Inspire's standardised risk assessment, escalation, management and safeguarding policies and procedures. Where necessary they will contact the participant's GP to mobilise referral to crisis response, NHS primary or secondary care. Likewise, if a safeguarding and vulnerable adults concern is identified this will be escalated, acted on and reported to the relevant statutory body – safeguarding team.

4.1.1 The PCL- 5 along with Core-10 will be completed at each therapy session. If ≥10 point rise in PCL-5 score occurs since the previous therapy session, or 15 point rise from baseline, or the maximum score of 80 is recorded on the PCL-5 alongside an escalation in risk "flagged" using CORE-10, they will use their clinical judgement to assess whether escalation is appropriate.

4.1.2 Any ≥10 point rise in PCL-5 score that occurs since the previous therapy session, or 15 point rise from baseline, or the maximum score of 80 is recorded on the PCL-5, will be detected by the unblinded member of the research team who will inform the DMEC chair within 3 working days.

4.2 If a participant's PCL-5 score rises by ≥10 points from the previous follow up, or 15 point rise from baseline, or the maximum score of 80 is recorded on the PCL5, the unblinded researcher will make contact with the participant within six hours of noting the rise in score and encourage them to contact their GP and/or their case worker. They will advise the participant that the researcher will need to contact the participant's case worker (or GP if no case worker) to alert them to the rise in PTSD symptoms.

5.0 Care escalation procedures in the case of serious adverse event

5.1 A serious Adverse Event that occurs during therapy will be investigated by Inspire according to their standardised clinical protocols and clinical governance framework

5.1.1 The serious adverse event will be investigated by Inspire's clinical lead or delegated representative using Inspire's standardised SAE procedures - template and within an agreed time-frame contingent on the nature and seriousness of the event.

5.1.2 The completed investigation report will include recommendations, shared learning and corrective actions each to be completed within a specified time frame, presented to and signed off by the Inspire CEO – Board alongside being shared with the DMEC chair for review.

5.2 A Serious Adverse Event that occurs following discharge from Inspire but whilst in the trial will be investigated by one of the study senior investigators (i.e. Sturt, Greenberg, Armour) using Inspire's SAE investigational policies and procedures. Inspire protocols and timeframes will be used. The investigational report will be submitted to the DMEC chair.

5.3 The DMEC chair will be notified within 24 hrs of the research team being notified of all serious adverse events.

6.0 Ineligible participants

6.1 Inspire Associate Consultant Clinical Psychologists will determine whether each potential participant meets the inclusion and exclusion criteria. They will use Inspire's standardised risk assessment, escalation and management guidelines, and safeguarding policies and procedures to adhere to Inspire's clinical governance framework and ensure that:

6.2 Those considered ineligible for the study will be safely signposted to alternative specialist voluntary or statutory services

6.2.1 Those referred by MoD Aftercare Service will be discharged back to MoD Aftercare Service to put in place a bespoke care plan to safely meet their identified needs.

6.3. For anyone ineligible, but assessed as high risk, the GP will be contacted to, where necessary, mobilise crisis response and potential referral to NHS primary or secondary care.

6.3.1 If referred by MoD Aftercare – the field worker will also be mobilised to make follow up contact with the individual.

6.4 Where safeguarding and vulnerable adult's concerns are identified this will be escalated, acted on and reported to the relevant statutory body – safeguarding team.

6.5 For any individual deemed at immediate high risk and who is unable to keep themselves safe, emergency services will be contacted directly.

Appendix 2 – CONSORT Diagram