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Evaluation of cognitive restructuring for post-traumatic stress disorder in people with severe mental illness

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Background
A cognitive–behavioural therapy (CBT) programme designed for post-traumatic stress disorder (PTSD) in people with severe mental illness, including breathing retraining, education and cognitive restructuring, was shown to be more effective than usual services.

Aims
To evaluate the incremental benefit of adding cognitive restructuring to the breathing retraining and education components of the CBT programme (trial registration: clinicaltrials.gov identifier: NCT00494650).

Method
In all, 201 people with severe mental illness and PTSD were randomised to 12- to 16-session CBT or a 3-session brief treatment programme (breathing retraining and education). The primary outcome was PTSD symptom severity. Secondary outcomes were PTSD diagnosis, other symptoms, functioning and quality of life.

Results
There was greater improvement in PTSD symptoms and functioning in the CBT group than in the brief treatment group, with both groups improving on other outcomes and effects maintained 1-year post-treatment.

Conclusions
Cognitive restructuring has a significant impact beyond breathing retraining and education in the CBT programme, reducing PTSD symptoms and improving functioning in people with severe mental illness.

Declaration of interest
None.

Individuals with severe mental illnesses such as schizophrenia, bipolar disorder and major depression are more likely to experience trauma over their lifetime than people in the general population.[1,2] This trauma exposure has been linked to a wide range of negative outcomes, including more severe symptoms and distress, more impaired functioning and higher utilisation of acute care services.[3,4] The high rate of trauma, and its associated clinical correlates, has drawn attention to the need for treatments to reduce the consequences of trauma in this population. Post-traumatic stress disorder (PTSD) is a common consequence of trauma exposure. Surveys indicate elevated rates of PTSD in people with severe mental illness, with most studies reporting current rates between 25 and 48%.[1] These rates are clearly higher than the average estimated prevalence of 3.5% for past year PTSD in the general population.[5] Effective interventions have been established for PTSD in the general population, with most research focusing on individuals exposed to specific types of trauma (for example combat, sexual assault) or to the broader range of traumatic events in community samples (such as accidents).[6] Less attention has been paid to tailoring treatments to meet the unique needs of people with severe mental illness and PTSD, such as high sensitivity to stress, psychotic symptoms and cognitive limitations. As noted by Spinazzola *et al*,[7] 'true advancement of the field will require a deliberate process of evaluation and adaptation of efficacious treatments with less restricted, more clinically representative PTSD samples'. To address this need, we developed an individual 12- to 16-session cognitive–behavioural therapy (CBT) programme for PTSD in people with severe mental illness, with simplified educational and worksheet materials to facilitate learning in people with cognitive and other challenges, and clinical guidelines to accommodate a wide range of clinical symptoms (such as psychosis, severe depression).[8] The first three sessions of the CBT programme involve teaching breathing retraining as a skill for reducing anxiety, and education about PTSD – both common components of PTSD treatment programmes in the general population.[9] The remaining 8–12 sessions focus on cognitive restructuring (i.e. identifying, evaluating and changing inaccurate and distressing thoughts, including trauma-related beliefs). We chose to focus on cognitive restructuring as the main active ingredient for the programme on the basis of research in the general population showing that cognitive restructuring and prolonged exposure therapy are of comparable efficacy with each other and are more effective than other approaches,[10–12] clinical experience using cognitive restructuring in the treatment of severe mental illness (such as schizophrenia, bipolar disorder, borderline personality disorder),[13–16] and because we anticipated it would be more acceptable to patients and less stressful than exposure therapy.

The feasibility and clinical benefits of the CBT for PTSD programme have been supported in two open clinical pilot studies and one randomised controlled trial (RCT) in participants with severe mental illness. The open pilot studies were conducted in rural New England, USA[17] and in an urban region of the state of New Jersey, USA,[18] and showed high retention in treatment and improvement in PTSD and other symptoms over time, which were sustained at 3 months. The controlled trial compared the CBT programme with usual services in participants receiving comprehensive mental health treatment at four centres in rural New England.[19] Participants who received the CBT programme

improved significantly more in PTSD symptoms, diagnosis and knowledge, and in other symptoms than those who received usual services, with benefits maintained 3- and 6-months post-treatment. These positive findings raise questions about which specific components of the CBT programme are most critical to changes in PTSD: education, breathing retraining or cognitive restructuring. Our dismantling design was based on principles explicated by such methodologists as Plante[20] and Wampold.[21] This approach to dismantling is used to evaluate the contribution of specific elements of complex treatment programmes by comparing variants of the programme that include or exclude critical parts. Such research designs may or may not compare different programme variants that are matched for duration and intensity. Thus, not all dismantling research controls for non-specific factors such as therapeutic alliance and expectation. It may be useful, in many instances, to evaluate the utility of adding one component in a complex intervention to other components. Dismantling research that retains the integrity of the original treatment components (including duration) can have important implications for service delivery as it may lead to the development of more efficient treatments by identifying unnecessary components that do not contribute to improved outcomes. In this study, we evaluated the effect of adding cognitive restructuring to the CBT programme by comparing the full 12- to 16-session programme to a brief, 3-session variant containing only breathing retraining and education. This study also addressed several other questions raised by previous research, including: can the CBT programme be successfully implemented by frontline (for example MA-level) clinicians, rather than by academically trained PhD therapists as in the previous studies; is the CBT programme effective when provided in urban settings serving more diverse minority ethnic groups; beyond PTSD symptoms, does the programme improve functioning and quality of life?

Method

A RCT was conducted comparing the full 12- to 16-week CBT for PTSD programme with a brief 3-session programme (including only breathing retraining and education) in a treatment system serving people with severe mental illness operated by the Rutgers University Behavioral Health Care (RUBHC). The study took place at five RUBHC sites in Northern and Central New Jersey, including three partial hospital programmes and two out-patient programmes. All study procedures were approved by the Rutgers and Dartmouth Institutional Review Boards (trial registration: clinicaltrials.gov identifier: NCT00494650).

Study participants

Inclusion criteria for study participants were:

(a) meets State of New Jersey definition of 'severe mental illness', including: (i) DSM-IV diagnosis;[22] (ii) significant functional limitations in major life activities within the past 3–6 months because of the mental disorder; and (iii) during the past 2 years, either two or more treatment episodes of greater intensity than could be treated with out-patient services or a single episode lasting 3 months or more, or disruption in normal living situation to the point that supportive services were required to maintain the patient in that living situation or law enforcement officials intervened;

(b) diagnosis of schizophrenia, schizoaffective disorder, major depression or bipolar disorder, based on the Structured Clinical Interview for DSM-IV Axis-I Disorders (SCID);[23]

(c) diagnosis of severe PTSD, based on the Clinician Administered PTSD Scale (CAPS) – schizophrenia version,[24] with a minimum CAPS total score of 65;[25]

(d) interested in receiving treatment for PTSD.

Individuals with borderline personality disorder were included if they met the other study criteria. Exclusion criteria were: (a) hospital admission or suicide attempt in the past 3 months and (b) substance dependence within the past 3 months. A total of 201 participants provided informed consent, completed baseline assessments, and were randomised to the CBT programme (CBT group, $n=104$) or the brief treatment programme (brief group, $n=97$). The CONSORT diagram illustrates the flow of participants through the study (Fig. 1). The characteristics of the two study groups are summarised in Table 1 (for a version that also includes treatment site see online Table DS1).

Measures

Evaluations included clinical interviews and self-report measures. Except as noted, assessments were conducted at baseline, post-treatment, and 6- and 12-months post-treatment. Assessments evaluated PTSD and other psychiatric diagnoses and symptoms, knowledge of PTSD, trauma-related cognitions, quality of life and psychosocial functioning.

Screening

Potentially eligible patients were identified by administering self-report screening instruments at each site, including a 16-item abbreviated version of the Traumatic Life Events Questionnaire,[26] followed by the PTSD Checklist (PCL) based on the most upsetting traumatic event, with a total score of $\geqslant 45$ on the PCL used to indicate probable PTSD.[27]

Interview-based assessments

PTSD symptom severity, the primary study outcome, and PTSD diagnosis were assessed with the CAPS (Schizophrenia Version).[24] Other Axis I psychiatric diagnoses were evaluated at baseline only with the SCID-I.[23] Borderline personality disorder diagnosis was assessed with the SCID-II.[28] Psychiatric symptoms were assessed with the Positive and Negative Syndrome Scale (PANSS).[29] The Brief Quality of Life Interview (QOLI) was used to assess subjective quality of life across different life domains.[30] Overall functioning was evaluated with the Global Assessment of Functioning (GAF) scale.[31]

Self-report measures

Understanding of PTSD was assessed with the PTSD Knowledge Test, which contains 15 multiple choice questions about PTSD and has been previously shown to be sensitive to the effects of education about trauma and PTSD in people with severe mental illness.[32] The Posttraumatic Cognitions Inventory (PTCI) was used to evaluate common negative beliefs about oneself, other people and the world that are often related to traumatic experiences.[33] Depression and anxiety severity were evaluated with the Beck Depression Inventory-II (BDI-II)[34] and the Beck Anxiety Inventory (BAI).[35]

Treatment programmes

All study participants continued to receive their usual psychiatric services following randomisation to either the CBT or the brief treatment programme.[8,36] In the first session of each intervention, the clinician provided a 15 min overview of the treatment

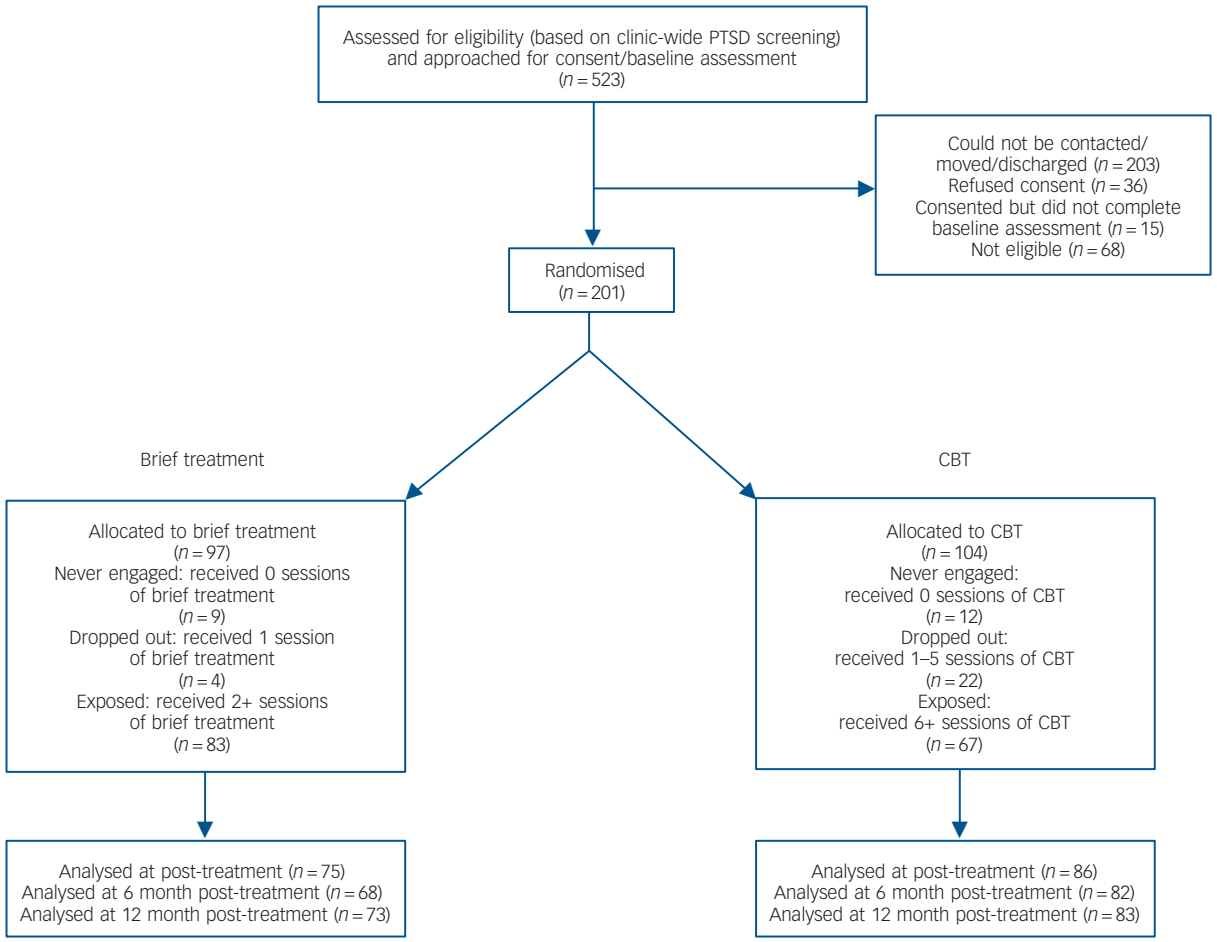

Fig. 1 Consort diagram of flow of participants through study.

CBT, Cognitive–behavioural therapy; PTSD, post-traumatic stress disorder.

programme, including the rationale for each topic and expectations for participation (for example home assignments to practise skills), followed by teaching breathing retraining and beginning education. As this session reviewed critical information about the programme to which the client had been assigned and initiated teaching, treatment engagement was defined as completion of at least one session of either programme.

CBT programme

This programme is based on cognitive models of PTSD that posit that a key dimension of the disorder is the cognitive distortions that result from the trauma exposure and subsequent attempts to cope with associated negative affect. These distortions typically include an elevated sense of danger and excessively negative appraisals of traumatic events or their consequences for oneself, other people or the world in general, which pose difficulties to integrating the experience into one's daily life and personal narrative.[37,38] The CBT programme is an individual intervention[8,19] that includes 3 sessions teaching breathing retraining for anxiety and education about trauma and PTSD, followed by 9–13 sessions of cognitive restructuring. Teaching methods and materials (handouts, worksheets) are specially adapted to accommodate the unique challenges of people with severe mental illness, such as psychotic symptoms, cognitive impairment and higher levels of stress vulnerability. Cognitive restructuring is taught as a self-management skill for dealing with negative feelings through the articulation of specific thoughts that underlie the distressing feeling, and the objective evaluation of evidence supporting those thoughts. Patients are taught how to modify inaccurate thoughts that are not supported by the evidence (for example 'I am responsible for my sexual abuse'), and how to develop 'action plans' to address situations in which distressing thoughts are deemed to be accurate (for example 'My new boyfriend is becoming abusive and I am at risk of getting hurt'). People initially learn cognitive restructuring to cope with any distressing feelings, and as their skills develop they shift to addressing trauma-related thoughts and beliefs that underlie PTSD symptoms. Home assignments to practise breathing retraining and cognitive restructuring skills are collaboratively set each session. Trauma work is integrated into comprehensive treatment by the therapist being a member of the individual's treatment team and through involvement of the case manager or primary clinician in at least one CBT session. Treatment exposure was *a priori* defined as completion of at least six sessions.[19]

Brief treatment programme

This three-session programme was designed to provide the same breathing retraining and educational components as the CBT programme, but without the cognitive restructuring. It was adapted from a programme we previously developed to educate persons with severe mental illness about PTSD.[32] In addition to

Table 1 Demographic and clinical characteristics of sample by treatment group assignment[a]

Categorical variables	Brief group ($n = 87$)	CBT group ($n = 104$)	χ^2	*t*-test (d.f.)	*P*
Gender, *n* (%)			0.236 (1)		0.63
Male	32 (33.0)	31 (29.8)			
Female	65 (67.0)	73 (70.2)			
Age	44.52 (11.60)	42.96 (10.46)		0.999 (199)	0.32
Ethnicity, *n* (%)			2.481[b] (1)		0.12
European–American	28 (28.9)	41 (39.4)			
African American	60 (61.9)	53 (51.0)			
American Indian Or Alaska Native	2 (2.1)	0 (0)			
Asian	1 (1.0)	1 (1.0)			
Native Hawaiian or Pacific Islander	1 (1.0)	0 (0)			
Mixed ethnicity	5 (5.2)	9 (8.7)			
Hispanic status, *n* (%)			0.935 (1)		0.33
Not Hispanic	77 (79.4)	88 (84.6)			
Hispanic	20 (20.6)	16 (15.4)			
Marital status, *n* (%)			7.016 (1)		0.008
Never married	61 (62.9)	46 (44.2)			
Ever married	36 (37.1)	58 (55.8)			
Education, *n* (%)			0.886 (1)		0.35
Did not complete high school	33 (34.0)	29 (27.9)			
Completed high school	64 (66.0)	75 (72.1)			
Living situation, *n* (%)			3.404 (1)		0.07
Not living independently	39 (40.2)	29 (27.9)			
Living independently	58 (59.8)	75 (72.1)			
Psychiatric diagnosis, *n* (%)			0.941 (3)		0.82
Major mood disorder only	44 (45.4)	49 (47.1)			
Schizophrenia spectrum only	27 (27.8)	26 (25.0)			
Major mood and borderline personality disorder	18 (18.6)	23 (22.1)			
Schizophrenia spectrum and borderline personality disorder	8 (8.2)	6 (5.8)			
Substance use diagnosis, *n* (%)			1.543 (3)		0.67
Alcohol use disorder	5 (5.2)	4 (3.8)			
Drug use disorder	1 (1.0)	2 (1.9)			
Alcohol and drug use disorder	1 (1.0)	0 (0)			

a. See online Table DS1 for a more detailed version of this table that includes data on treatment site.
b. Based on comparison of European–American *v.* other.

using the same handouts and worksheets on anxiety management and PTSD as in the CBT programme, the brief programme uses a video to initiate discussion between the patient and therapist about the causes and nature of PTSD. Treatment exposure was defined *a priori* as completion of at least two sessions.

Standard treatment

All study participants continued to receive pharmacological treatment and case management, and had access to the range of available services at their treatment setting. No interventions specifically targeting PTSD were provided as a part of standard treatment at any of the study sites. Patients in the partial hospital programmes participated in a variety of education, skills or topic groups. Participants in the out-patient programmes had access to individual psychotherapy, vocational rehabilitation and limited group therapy.

Clinician training and treatment adherence monitoring

Both PTSD treatment programmes were provided by frontline clinicians who were already employed by RUBHC. Prior to treating study participants, 25 clinicians (95% MA-level, with approximately 10 years (s.d. = 7.14) therapy – although not necessarily CBT – experience) received training in the CBT programme. This included a 2-day live training, followed by weekly group supervision and treating one or two practise patients with timely (for example weekly) feedback using a standardised 17-item, five-point (ranging from 1, poor to 5, excellent) adherence measure based on review of audio-recorded sessions. 'Certification' in the CBT programme was defined as meeting a pre-specified level of competence in sessions 4–16, which focus on cognitive restructuring. Two clinicians dropped out of the training, 21 clinicians were certified after completing one practise case, and two clinicians were certified after completing a second practise case. Further details about the training protocol are provided elsewhere.[39]

Clinicians at each site met for weekly group supervision for both programmes over the course of the study, and were joined regularly by a study team expert consultant by phone. Following the certification of clinicians, adherence ratings were conducted on 5–10% of all sessions, which were provided to clinicians and their supervisors for review and discussion.

Procedures

Recruitment

Following administration of the trauma and PTSD screening instruments at the five clinic sites, patients were given information about the PTSD study and they indicated whether they would be interested in being contacted by the research team if they met preliminary eligibility criteria for the study. Potentially eligible and interested patients were contacted by a team member, who described the study and obtained informed consent. The baseline

assessment was then conducted to confirm eligibility, with individuals meeting all criteria randomised to either the CBT or brief programme following completion of the interview. Participants were paid for completing baseline assessments, regardless of whether they enrolled in the study.

Randomisation and follow-up assessments

Participants were randomised to the CBT or brief groups via a computer program operated by an off-site data manager, with no study personnel aware of assignments in advance. Randomisation was stratified by site (five sites) and primary diagnosis (three categories: schizophrenia–schizoaffective without borderline personality disorder; major mood disorder without borderline personality disorder; schizophrenia–schizoaffective or major mood disorder, with borderline personality disorder). Within sites, assignment of patients to clinicians was balanced so that each clinician treated approximately equal numbers of participants in each intervention.

In order to avoid confounding the treatment programme (CBT or brief) with the duration of time elapsed between the baseline and subsequent assessments, the follow-up assessment dates for the participants in the brief group were yoked to the dates for the post-treatment and follow-up assessments of those in the CBT group. All interviewers were masked to treatment assignment. Participants were paid for completing assessments.

Statistical analyses

Based on our prior study comparing CBT with usual services,[17] we estimated power to detect a group (CBT *v.* brief) effect size on the CAPS total score (the primary study outcome) of $d = 0.45$, with three post-baseline assessments, and assuming a 20% attrition rate, 0.5 subject correlation and $\alpha = 0.05$. With 100 participants per group, the power to detect an effect size $d \geqslant 0.45$ on the CAPS total was 0.89. This level of power was deemed sufficient to justify the intended sample size of $n = 200$.

Demographic and clinical differences at baseline between the two programmes were evaluated using χ^2 analyses or *t*-tests. Intent-to-treat analyses were conducted using covariance pattern models within a general mixed-effects linear regression models framework[40] to evaluate the effect of treatment on the outcome measures. For these models, baseline was included as a covariate, and the post-treatment and 6- and 12-month follow-up assessments were the repeated dependent variables. Treatment group, site and marital status were included as the independent variables, as well as the group × time and group × site interactions. The cross-time correlations were explicitly modelled (freely estimated) using an unstructured variance–covariance matrix. Since baseline scores were entered as covariates, the main effect of group tests whether participants in the CBT group differed significantly from those in brief group across the post-treatment assessments, the main effect for time tests whether study participants in both groups changed over the three post-treatment assessments and the group × time interaction tests whether the two groups changed differentially across the post-treatment assessments. Cohen's *d* effect sizes were calculated based on the average difference between the two groups across all post-treatment assessments, adjusting for baseline.[41]

Results

Comparisons of the two groups at baseline indicated one significant difference: more participants in the CBT group had married than in the brief group (Table 1). Follow-up assessments were completed on 80% of the sample at post-treatment, 76% at 6 months, and 78% at 12 months, with 91% completing at least one follow-up assessment. There were no differences between treatment groups in rates of follow-up interviews.

Engagement and exposure to treatment programmes

Engagement in both programmes was high, with 88/97 (91%) participants in the brief group and 92/104 (89%) participants in the CBT group completing at least one session. Among engaged participants, 83/88 (94%) were exposed to the brief programme by completing at least two sessions, and 67/92 (73%) were exposed to CBT by completing at least six sessions. There were no site differences in rates of engagement for either programme, or rates of exposure to the brief programme. However, there were site differences in rates of exposure to the CBT programme ($\chi^2 = 15.84$, d.f. = 4, $P = 0.003$), with participants in the three partial hospital programmes having higher rates of exposure (68%, 85%, 100%) than participants in the two out-patient programmes (47%, 49%).

Clinician adherence to treatment models

Adherence ratings were high for both treatments. The average overall session quality item for 25 sessions rated for the brief programme was 4.36 (s.d. = 0.70) and the average rating across the 13-item scale was 4.34 (s.d. = 0.50), between 'good' and 'excellent'. For CBT, the average overall session quality item for 90 rated sessions was 3.84 (s.d. = 0.75) and the average rating across the 17-item scale was 3.96 (s.d. = 0.64), between 'satisfactory' and 'good'.

Intent-to-treat outcome analyses

The analyses of the primary outcome, PTSD symptom severity (CAPS total), and other PTSD measures indicated significant treatment group effects favouring the CBT over the brief programme (see group effect, Table 2). Although participants in both programmes improved from baseline to the post-treatment and follow-up assessments on all PTSD measures, those in the CBT group improved significantly more. There were also significant time effects for the CAPS total and the CAPS re-experiencing and avoidance subscales, but no group × time interactions, with participants in both interventions improving from post-treatment to the 6- and 12-month follow-ups (Table 2).

The analyses of the other outcomes indicated significant group effects, with the CBT group improving more than the brief group on overall functioning (GAF) and social functioning (CAPS) but not the other variables (Table 3). However, there were significant group × time interactions for social functioning and post-traumatic cognitions (PTCI), with the CBT group improving more than the brief group at post-treatment, and the brief group catching up by 12-months post-treatment. There were also significant time effects for depression (BDI-II) with both groups improving from post-treatment to the follow-up assessments. Participants in both interventions tended to improve from baseline to the follow-up assessments on all of the secondary outcomes.

Discussion

Main findings

Study participants with severe mental illness and PTSD who received the full 12- to 16-week CBT programme, including breathing retraining, education and cognitive restructuring, experienced significantly greater reductions in PTSD symptoms (which was the primary outcome for this study), higher rates of remission of PTSD diagnosis and greater improvements in

Table 2 Post-traumatic stress disorder (PTSD) outcomes in the cognitive–behavioural therapy (CBT) and brief groups

	Mean (s.d.)				Treatment group effect		
	Baseline	Post-treatment	6 months	12 months	Effect size	*F* (d.f.)	*P*
CAPS – total,[a] mean (s.d.)					−0.29	6.51 (1,170)	0.01
CBT group	86.06 (13.46)	63.55 (27.14)	63.23 (28.96)	60.62 (28.41)			
Brief group	85.76 (13.11)	70.38 (25.01)	70.17 (24.69)	65.90 (26.44)			
CAPS – re-experiencing,[b] mean (s.d.)					−0.30	5.66 (1,171)	0.01
CBT group	22.30 (6.77)	15.19 (8.96)	15.29 (9.28)	13.45 (10.09)			
Brief group	23.62 (6.50)	17.80 (8.39)	16.56 (9.28)	16.04 (9.22)			
CAPS – avoidance,[c] mean (s.d.)					−0.16	4.93 (1,171)	0.02
CBT group	36.82 (7.28)	27.89 (12.36)	27.62 (12.84)	26.96 (12.76)			
Brief group	35.17 (7.19)	29.80 (11.89)	29.72 (11.37)	27.55 (12.25)			
CAPS – hyperarousal, mean (s.d.)					−0.30	4.61 (1,171)	0.03
CBT group	26.72 (6.08)	20.56 (9.62)	20.43 (10.15)	20.70 (10.15)			
Brief group	26.89 (5.03)	22.75 (8.99)	23.90 (8.44)	22.48 (9.44)			
PTSD knowledge, mean (s.d.)					0.73	6.01 (1,167)	0.01
CBT group	10.20 (2.64)	10.89 (2.19)	10.69 (2.39)	10.86 (2.23)			
Brief group	9.62 (2.32)	9.86 (2.36)	9.84 (2.59)	9.27 (2.57)			
PTSD diagnosis, yes: *n/N* (%)					−0.26	6.33 (1,172)	0.01
CBT group	104 (100)	55/86 (64)	52/82 (63)	49/83 (59)			
Brief group	97 (100)	55/75 (73)	52/68 (76)	51/73 (70)			
Severe PTSD diagnosis,[d] yes: *n* (%)					−0.23	9.61 (1,172)	0.002
CBT group	104 (100)	44/86 (51)	37/82 (45)	36/83 (43)			
Brief group	97 (100)	48/75 (64)	44/68 (65)	39/73 (53)			

CAPS, Clinician Administered PTSD Scale.
a. Significant time effect from post-treatment to 6- and 12-month follow-ups, $F = 3.51$, d.f. = 2,170, $P = 0.03$.
b. Significant time effect from post-treatment to 6- and 12-month follow-ups, $F = 3.60$, d.f. = 2,171, $P = 0.02$.
c. Significant time effect from post-treatment to 6- and 12-month follow-ups, $F = 2.92$, d.f. = 2,171, $P = 0.05$.
d. Significant time effect from post-treatment to 6- and 12-month follow-ups, $F = 3.59$, d.f. = 2,172, $P = 0.02$.

Table 3 Other outcomes for the cognitive–behavioural therapy (CBT) and brief groups

	Mean (s.d.)				Treatment group effect		
	Baseline	Post-treatment	6 months	12 months	Effect size	*F* (d.f.)	*P*
Posttraumatic Cognitions Inventory[a]					0.03	0.09 (1,170)	0.77
CBT group	2.91 (2.22)	2.52 (2.05)	2.62 ((2.14)	2.57 (2.18)			
Brief group	2.89 (2.24)	2.75 (2.18)	2.19 (1.90)	2.47 (2.07)			
Positive and Negative Syndrome Scale					−0.25	2.46 (1,164)	0.11
CBT group	65.75 (11.24)	62.25 (16.80)	64.10 (17.71)	60.21 (15.40)			
Brief group	67.18 (11.65)	61.33 (12.67)	65.37 (15.56)	66.72 (19.56)			
Beck Depression Inventory-II[b]					0.03	0.65 (1,169)	0.42
CBT group	30.54 (12.43)	23.51 (14.06)	25.00 (13.99)	23.43 (13.19)			
Brief group	29.84 (12.07)	26.07 (14.46)	24.13 (12.77)	22.42 (14.40)			
Beck Anxiety Inventory					−0.17	2.08 (1,167)	0.15
CBT group	29.20 (14.84)	23.31 (15.11)	24.60 (16.30)	23.44 (15.04)			
Brief group	29.28 (14.28)	26.35 (15.07)	26.25 (15.27)	24.78 (17.58)			
Global Assessment of Functioning					0.21	4.56 (1,164)	0.03
CBT group	48.37 (8.35)	55.96 (9.91)	55.36 (8.96)	57.45 (9.66)			
Brief group	47.91 (8.15)	55.23 (8.93)	54.16 (10.26)	55.4 (10.76)			
Quality of Life – General					−0.11	0.59 (1,170)	0.44
CBT group	3.03 (1.35)	3.96 (1.59)	3.93 (1.49)	4.08 (1.53)			
Brief group	3.59 (1.41)	4.07 (1.63)	4.04 (1.53)	4.16 (1.76)			
Social functioning – Clinician Administered PTSD Scale[c]					−0.22	3.81 (1,169)	0.05
CBT	2.35 (0.79)	1.62 (1.08)	1.40 (1.18)	1.55 (1.12)			
Brief	2.36 (0.81)	1.91 (1.09)	1.84 (1.19)	1.51 (1.16)			

a. Significant time effect from post-treatment to 6- and 12-month follow-ups, $F = 4.43$, d.f. = 2,170, $P = 0.01$; significant group × time interaction, $F = 3.39$, d.f. = 2,170, $P = 0.03$.
b. Significant time effect from post-treatment to 6- and 12-month follow-ups, $F = 3.26$, d.f. = 2,169, $P = 0.04$.
c. Significant group × time interaction, $F = 3.40$, d.f. = 2,169, $P < 0.02$.

knowledge of PTSD than those who received the brief 3-session programme (including only the breathing retraining and education components). The magnitude of improvements in PTSD for participants who received the CBT programme was comparable with that in the first RCT,[19] demonstrating that the programme can be successfully implemented by frontline clinicians in urban settings serving predominantly people from minority ethnic backgrounds with severe mental illness, with effects sustained for 1 year post-treatment. Furthermore, participants who received the full CBT programme demonstrated modestly greater improvements in overall functioning, and improved more rapidly in social functioning, providing evidence

for additional benefits of the full programme beyond just the symptom relief previously demonstrated. These findings replicate and extend previous research on the CBT programme.[19]

Although participants in the full CBT programme improved more than those in the brief programme in terms of PTSD symptoms and overall functioning, the brief treatment programme appeared to be clinically beneficial when compared with the usual services condition in the first study.[19] For example, in the previous study, 90% of participants with severe PTSD who received usual services still had PTSD at the post-treatment assessment, and 88% had PTSD at 6 months,[19] compared with rates of 73% and 76% at the same assessment points for participants in the present study who received the brief treatment programme. Furthermore, participants in both groups demonstrated comparable reductions in post-traumatic cognitions and depression, which were similar to the improvements made by the CBT group and greater than those in the usual services group in the previous study.[19]

The greater impact of the CBT programme over the brief treatment programme on PTSD symptom improvement and functioning may reflect the impact of providing cognitive restructuring in addition to breathing retraining and education, although the role of non-specific treatment factors associated with the longer programme cannot be ruled out. However, it should also be noted that all study participants were receiving a range of other treatments for their primary psychiatric disorder, with three of the five sites being partial hospital programmes with approximately 5 h per day of psychosocial programming. The relative contribution of cognitive restructuring versus non-specific treatment effects to the improved PTSD symptoms and functional outcomes for the CBT programme cannot be determined by our study design, but the relatively small number of additional hours of treatment related to CBT (9–13 h more than in the brief treatment programme) is modest in proportion to participants' total treatment history. In general, published findings demonstrate the beneficial effects of cognitive restructuring for the treatment of PTSD.[10–12,42–44]

Implications

The apparently beneficial effects of the brief treatment programme and the stronger impact of the full CBT programme on PTSD suggest that it may be possible to develop more efficient treatments for PTSD in people with severe mental illness. For example, briefer interventions may be more feasible, acceptable, and cost-effective in some settings than comprehensive treatments. Alternatively, a stepped care treatment model (for example the brief treatment programme provided first followed by the longer CBT programme if needed), may prove useful for this population, as have stepped care approaches for the treatment of depression, anxiety and injured trauma survivors.[45,46] Further research is needed to evaluate such approaches.

People with severe mental illness are exposed to more trauma and are more prone to PTSD and have worse functional outcomes than people in the general population, but they have typically been excluded from clinical trials of PTSD because of problems such as psychotic symptoms and self-injurious behaviour.[7] The findings of this study, when combined with our prior research,[19] provides additional evidence that PTSD can be effectively treated in these individuals with the standardised CBT programme.[8] Our intervention, to our knowledge, is the first of its kind that addresses PTSD in people with severe mental illness that has demonstrated significant benefits in RCTs. Increasing access to effective interventions for people with severe mental illness and co-occurring PTSD is an important priority for reducing distress and improving functioning in this vulnerable population whose trauma-related treatment needs are so often neglected.

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EXTRA CONTENT ONLINE

100 words

Psychosocial aspects of addiction

Ken Checinski

Psychosocial interventions for substance misusers are diverse, with NICE guidance supporting brief interventions (particularly for alcohol), self-help (e.g. AA, NA and SMART Recovery) and contingency management (including supporting families) in particular. Often, recovery involves the unpicking and reshaping of complex behavioural patterns, social and family networks and the effective treatment of mental illness. Sometimes, the need for intensive treatment necessitates a phase of residential rehabilitation in addition to usual community options. Sustainable recovery is underpinned by more than behavioural stability or sobriety. Modern addiction services promote well-being, increasingly as defined by the patient rather than by politicians, doctors or society.

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Data supplement

Table DS1 Demographic and clinical characteristics of sample by treatment group assignment, including treatment site

Categorical variables	Brief group ($n = 87$)	CBT group ($n = 104$)	χ^2	*t*-test (d.f.)	*P*
Gender, *n* (%)			0.236 (1)		0.63
Male	32 (33.0)	31 (29.8)			
Female	65 (67.0)	73 (70.2)			
Age	44.52 (11.60)	42.96 (10.46)		0.999 (199)	0.32
Ethnicity, *n* (%)			2.481[a] (1)		0.12
European–American	28 (28.9)	41 (39.4)			
African American	60 (61.9)	53 (51.0)			
American Indian Or Alaska Native	2 (2.1)	0 (0)			
Asian	1 (1.0)	1 (1.0)			
Native Hawaiian or Pacific Islander	1 (1.0)	0 (0)			
Mixed ethnicity	5 (5.2)	9 (8.7)			
Hispanic status, *n* (%)			0.935 (1)		0.33
Not Hispanic	77 (79.4)	88 (84.6)			
Hispanic	20 (20.6)	16 (15.4)			
Marital status, *n* (%)			7.016 (1)		0.008
Never married	61 (62.9)	46 (44.2)			
Ever married	36 (37.1)	58 (55.8)			
Education, *n* (%)			0.886 (1)		0.35
Did not complete high school	33 (34.0)	29 (27.9)			
Completed high school	64 (66.0)	75 (72.1)			
Living situation, *n* (%)			3.404 (1)		0.07
Not living independently	39 (40.2)	29 (27.9)			
Living independently	58 (59.8)	75 (72.1)			
Psychiatric diagnosis, *n* (%)			0.941 (3)		0.82
Major mood disorder only	44 (45.4)	49 (47.1)			
Schizophrenia spectrum only	27 (27.8)	26 (25.0)			
Major mood and borderline personality disorder	18 (18.6)	23 (22.1)			
Schizophrenia spectrum and borderline personality disorder	8 (8.2)	6 (5.8)			
Substance use diagnosis, *n* (%)			1.543 (3)		0.67
Alcohol use disorder	5 (5.2)	4 (3.8)			
Drug use disorder	1 (1.0)	2 (1.9)			
Alcohol and drug use disorder	1 (1.0)	0 (0)			
Treatment site, *n* (%)			0.169 (4)		1.00
Newark out-patient	39 (40.2)	41 (39.4)			
Newark partial hospital	13 (13.4)	13 (12.5)			
New Brunswick partial hospital	13 (13.4)	13 (12.5)			
New Brunswick out-patient	13 (13.4)	15 (14.4)			
Monmouth partial hospital	19 (19.6)	22 (21.2)			

a. Based on comparison of European–American *v.* other.

Evaluation of cognitive restructuring for post-traumatic stress disorder in people with severe mental illness

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