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Treating taboo thoughts on a psychiatric intensive care unit: a four-phase mixed methods single case experimental design

Stephen Kellett[1,2], Chris Gaskell[3], Andy Keslake[1], Mike Seneviratne[1] and Melanie Simmonds-Buckley[1,2]

[1]Rotherham Doncaster and South Humber NHS Foundation Trust, UK, [2]University of Sheffield, Sheffield, UK and [3]North Staffordshire Combined NHS Foundation Trust, UK
Corresponding author: Stephen Kellett; Email: stephen.kellett@nhs.net

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Abstract

Background: Well-designed evaluations of psychological interventions on psychiatric intensive care units (PICUs) are a rarity.
Aims: To evaluate the effectiveness of cognitive behaviour therapy for intrusive taboo thoughts with a patient diagnosed with bipolar affective disorder admitted to a PICU due to significant ongoing risk of harm to self.
Method: This was a four-phase ABC plus community follow-up (D) mixed methods $n = 1$ single case experimental design. Four idiographic measures were collected daily across four phases; the baseline (A) was during PICU admission, the first treatment phase (B) was behavioural on the PICU, the second treatment phase (C) was cognitive on an acute ward and the follow-up phase (D) was conducted in the community. Four nomothetic measures were taken on admission, on discharge from the PICU, discharge from the acute ward and then at 4-week follow-up. The participant was also interviewed at follow-up using the Change Interview.
Results: Compared with baseline, the behavioural and the cognitive interventions appeared effective in terms of improving calmness, optimism and rumination, but the effects on sociability were poor. There was evidence across idiographic and nomothetic outcomes of a relapse during the follow-up phase in the community. Eleven idiographic changes were reported in the interview and these tended to be unexpected, related to the therapy and personally important.
Discussion: Single case methods can be responsive to tracking the progress of patients moving through in-patient pathways and differing modules of evidence-based interventions. There is a real need to implement robust outcome methodologies on PICUs to better evaluate the psychological aspects of care in this context.

Keywords: Obsessive-compulsive disorder; In-patient CBT; Therapy outcome

Introduction

Psychiatric intensive care units (PICUs) are highly specialist, locked and secure 24-hour in-patient wards staffed by multi-disciplinary teams (MDT) providing assessment and comprehensive treatment in a deliberately low stimulus environment (Bowers *et al.*, 2008). The majority of PICU patients are admitted under the Mental Health Act and are from an ethnic minority, are male and are typically presenting with significant symptoms of schizophrenia or bipolar affective disorder (Feinstein and Holloway, 2002). The role of chronic and detrimental social and environmental conditions in creating the need for in-patient admissions is well established (Walker *et al.*, 2019).

Clinically, the MDT is often trying to treat the psychosis and/or mania in the context of substance misuse; the patient is at high risk of absconding, poses a significant risk to self and/or others and has a forensic history (Brown and Bass; 2009; Bowers *et al.*, 2008; Kasmi, 2007; Mele *et al.*, 2022). The MDT sees its main function as ensuring the safety of patients and PICU admissions are therefore often a short-term measure to manage significant risk (Thibaut *et al.*, 2019). Patients are stepped up and down to neighbouring acute in-patient psychiatric wards according to risk acuity and responsivity to treatment (Brown and Bass, 2009; Kasmi, 2007). The average length of PICU admissions is 25.9 days, but there is also evidence of wide variability (i.e. 1 to 215 days; Felix, 2023).

PICU treatments are in the main pharmacological, including parenteral route rapid tranquilisation when required (Winkler *et al.*, 2019). Some patients also require restrictive management approaches such as seclusion, segregation and restraint to manage and contain the risks posed to self and others (Bowers *et al.*, 2008). Seclusion rooms are therefore also a feature of the PICU physical environment, with PICU staff having positive attitudes to the use of seclusion in the management of risks (Pettit *et al.*, 2017). Young female patients detained under the Mental Health Act are more likely to be placed in seclusion rooms (Cullen *et al.*, 2018). Patients are most likely to display physical aggression towards the MDT (Mele *et al.*, 2022) and the resultant restraint puts both patient and staff at risk of injury (Mele *et al.*, 2022; Yusuf *et al.*, 2020). Unfortunately, the rate of post-traumatic stress disorder following the use of such restraint for patients varies between 25 and 47% (Chieze *et al.*, 2019) – the rate for staff is currently unknown, but compassion fatigue is a feature (Peters, 2018).

Psychological input during in-patient psychiatric care has been advocated for at a policy level (British Psychological Society, 2021), in order to expand the range and scope of the clinical offer for patients during admissions (Rodriguez *et al.*, 2023). This championing has only patchily triggered access rates to psychological interventions to be seen to increase during in-patient psychiatric admissions, with this particularly evident for PICUs (Garcia *et al.*, 2005). The needs of the PICU MDT are for the psychological professionals that are members of the MDT to provide team and individual supervision, facilitation of scheduled reflective practice, specialist assessment, enabling direct and indirect case formulation work and delivering one-to-one therapy with in-patients (Raphael *et al.*, 2020). The direct:indirect input ratio is likely to differ for each patient according to their presentation and current levels of distress and risk (Cox and Kellett, 2023). Lack of research evidence means there is little guidance as to the most likely effective psychological intervention to deliver on PICUs (Archer *et al.*, 2016).

Considering the appropriateness of the method in terms of the highly variable presentations treated in in-patient wards, the usage of single case experimental design (SCED) has been disappointingly piecemeal in these settings. This may be due to the mistaken assumption that there needs to be a stable baseline methodologically or clinically the presence of a chronic and long-standing difficulty. For example, mood disorders such as cyclothymia are based upon mood instability and therefore variability should be expected in the baseline (i.e. the presence of stable instability), with the method testing whether the intervention then observably reduces variability (see Totterdell and Kellett, 2008, as an example). SCED are experimental designs testing the effectiveness of psychological interventions defined by the use of small patient numbers (i.e. often a single patient), being grounded in intensive and repeated idiographic and nomothetic measurement, having the sequential (sometimes randomised) introduction (and sometimes withdrawal) of interventions that are then compared with baseline functioning, and with SCED having its own stable of data analytics including both visual analysis and statistical analyses (Krasny-Pacini and Evans, 2018). SCED is flexible and cost-effective and is appropriate for evaluating newly developed treatments, translational research, personalised medicine and is particularly useful when evaluating outcomes in rare settings with rare disorders (Epstein and Dallery, 2022).

Using a multiple baseline design, Folke *et al.* (2015) evaluated 10 sessions of behavioural activation with $n = 6$ depressed in-patients, and reported decreased depressive symptoms and

increased activation compared with stable baselines in 4/6 patients. The weakness of this study is that all the measures were nomothetic, as is the case with multiple baseline designs (Slocum *et al.*, 2022). Tryberg and Klintwell (2022) evaluated three sessions of behaviour therapy for $n = 3$ in-patients using the 'personal questionnaire' (PQ) and found a significant effect of the intervention (Tau = 0.52; $p<0.01$). The weakness of this study was diagnostic variability between the patients. Cox and Kellett (2023) completed an $n = 1$ biphasic quasi-experimental evaluation of a schema-informed formulation, to show that restrictive interventions on a PICU were no longer necessary. The weakness of this study was the lack of follow-up, the lack of idiographic outcome measures and the measure of restraint frequency being psychometrically unvalidated. Cox and Kellett (2023) called for more methodologically complex SCEDs to be completed with PICU patients and particularly collection of idiographic outcomes, use of validated nomothetic outcome measures and indexing outcomes over follow-up time.

The aim of the current study was therefore to conduct a SCED in which there was greater methodological precision and where outcomes were indexed via idiographic and nomothetic measures. The study used mixed methods, and this has not been attempted before in a PICU context. The current study evaluated the implementation of a behavioural and then a cognitive intervention with follow-up in an experimental $n = 1$ methodology (i.e. ABCD). The study therefore had two treatment phases containing differing change methods and a follow-up phase to compare baseline functioning against. The high and ongoing levels of distress for PICU patients means that research has been traditionally considered too difficult to conduct in this setting (Salzann-Erikson and Söderqvist, 2017). The current study sought to address this assumption by conducting a SCED with a patient with an established diagnosis of bipolar affective disorder, in which there were significant risks of self-harm due to the guilt and shame associated with high frequency intrusive taboo thoughts about harming family members. The idiographic study hypotheses were that (1) both treatment phases would be effective compared with baseline, (2) that there would be no differences between the treatment phases in terms of effectiveness and (3) that the changes produced by treatment would be durable over the follow-up. The nomothetic hypothesis was that there would a reliable and clinically significant reduction in symptoms due to treatment and this change would be maintained over the follow-up period.

Method

Design and context

The single case reporting guidelines have been used to report this SCED (SCRIBE; Tate *et al.*, 2016). The study was a crossover design with two treatment phases and follow-up phase (Hersen, 1990). This created an ABCD SCED tracking four daily idiographic outcome measures over in-patient admission and community follow-up time. The idiographic and nomothetic outcomes were shared with the participant at follow-up. The baseline (A) contained two one-to-one sessions (i.e. total session time = 100 minutes) on the PICU, the first intervention phase (B) contained six one-to-one sessions (i.e. total session time = 300 minutes) on the PICU, the second treatment phase was on an acute ward and had four one-to-one sessions (i.e. total session time = 200 minutes). The study was conducted in routine practice in a 5-bedded mixed-sex PICU in a northern city in the United Kingdom and 18-bedded mixed-sex acute ward on the same hospital site. The therapy was delivered by a British Association of Behavioural and Cognitive Psychotherapy (BABCP) accredited Consultant Clinical Psychologist under monthly clinical supervision.

Idiographic measures, administration and analysis

The idiographic measures were introduced on admission as a way of tracking progress and capturing issues to bring to sessions. Collecting each idiographic measure daily across the four study phases

therefore created four 84-day time series for the study. The baseline (A) on the PICU lasted 14 days, the behavioural intervention phase (B) on the PICU lasted 15 days, the cognitive intervention phase (C) on the acute ward lasted 27 days, and the follow-up lasted 28 days in the community. Idiographic outcomes were collected by the patient completing a paper-based daily diary. A number count of intrusions was also in the diary, but this was not completed sufficiently frequently to report. The four idiographic measures co-designed with the patient were: *my calmness today* (calm 0 to panicky 100), *my optimism today* (0 pessimistic to 100 optimistic), *ruminating today* (0 not at all, to all the time) and *sociability today* (0 isolating myself to 100 being sociable). The measures were personally meaningful to the patient as he recognised the impact on his mental state of the intrusive thoughts, that he would frequently get caught up in ruminating on what the thoughts meant and that he behaviourally isolated himself from people due to the shame of the thoughts. All idiographic analyses were conducted using the R statistical environment (R Core Team, 2020; v4.0.2). Interrupted time series plots of the idiographic outcomes were developed using the *ggplot* package (Wickham, 2016) and the scales were reversed scored, so that clinical improvement would be signalled by an ascending time series plot. Time series plots were inspected by the research team to consider relevant features of visual analysis. Of relevance to the SCED were changes between study phases (i.e. in level, immediacy of effect and variability). Baseline phase stability was assessed in each idiographic measure using Kendall's τ (i.e. non-parametric population). As baseline phases for all measures demonstrated baseline stability, it was not necessary to make statistical adjustments. Three non-overlap statistics assessed effectiveness (i.e. PEM, NAP and PAND). Percentage exceeding median (PEM) refers to the percentage of intervention phase data that exceeds the median of the baseline phase. Non-overlap of all pairs (NAP; Parker and Vannest, 2009) performs pairwise comparisons between all baseline data points and interventions data points. Percentage of all non-overlapping data (PAND) is the smallest possible proportion of data points to be removed to ensure no overlap between phases. To interpret the non-overlap effect sizes, the Scruggs and Mastropiere (1998) descriptors were used: 50–69% = questionable effectiveness, 70–89% = moderate effectiveness, $\geq$90% = highly effective.

Nomothetic measures, administration and analysis

Four valid and reliable nomothetic measures were administered at baseline (time 1), discharge from the PICU (time 2), discharge from the acute ward (time 3) and 4-week follow-up (time 4). These measures were introduced as a way of better understanding the problems the patient experienced, and as another method for evaluating change. The measures were as follows: the Patient Health Questionnaire-9 (PHQ-9; Kroenke *et al.*, 2001), Generalised Anxiety Disorder-7 (GAD-7: Spitzer *et al.*, 2006), Obsessive Compulsive Inventory (OCI; Foa *et al.*, 2002) and the Yale-Brown Obsessive Compulsive Scale (Y-BOCS; Goodman *et al.*, 1989). Whether reliable (i.e. positive reliable change score) and clinically significant (i.e. moving from a clinical to a non-clinical distribution) change occurred was calculated between each administration point on each of the four measures. For example, on the PHQ-9, clinical change was seen to have occurred when the score moved below 9 (i.e. the score was then in the community range) and a reliable change was recorded when the score had dropped by 5 or more in comparison with the previous administration.

Change Interview

This is a semi-structured interview that can be conducted at mid-treatment, end of treatment, or at follow-up (Rodgers and Elliott, 2015). It was conducted at 4-week follow-up on the hospital site, lasted 45 minutes and this was completed by a psychiatrist to reduce bias (i.e. not the therapist). The central concern of the Change Interview is to identify whether change has occurred during therapy, what the changes are and whether they are connected (or not) to the therapy delivered

(i.e. the interview tries to work against the expectation that therapy is helpful; Thompson and Harper, 2012). In this study, the participant reviewed the therapy and then identified changes and rated each change in terms of *expectation* (i.e. 1 expected to 5 surprising), *possibility* (i.e. 1 unlikely to have changed without therapy to 5 likely to have changed without therapy) *and personal importance* (1 not at all to 5 extremely).

The participant

The participant was a 35-year-old man with an established diagnosis of bipolar affective disorder. There were no birth complications, and all normal developmental milestones were met. He attended mainstream school, finishing at 18 years with high levels of educational achievement. He attended University, but left after 1 year due to not enjoying the course, and this pattern was repeated at another University. The participant had a good work record and had been working full-time prior to admission. He lived alone in his own house.

He was admitted initially informally to a general adult psychiatric ward. He reported strong and intrusive urges to hurt his family and had reported himself to the police because of his fears that he would act on his thoughts. He was assessed by a Community Mental Health Team that identified additional depression, hopelessness and poor sleep and grandiose thinking. The trigger for his manic relapse was a recent holiday abroad and an associated lack of sleep and self-care. He self-harmed on admission through unsuccessfully amputating his eyelids and successfully amputating nine fingernails. Following this and two days after admission, he was detained under Section 2 of the Mental Health Act, and he was transferred to the PICU to maintain his safety. He was treated (20 mg Olanzapine) for a severe depressive episode with psychotic features in keeping with a relapse of his known bipolar affective disorder. He was an in-patient on PICU for 28 days and was regraded to informal before being transferred back to the general adult ward. He was discharged from in-patient services after a further 28 days on the general adult ward.

The participant first presented in secondary mental health services in 2010 with low mood and persecutory delusions, treated in the Home-Based Treatment team (10 mg Olanzapine) and diagnosed with acute and transient psychotic disorder. He was referred to the Early Intervention Team and after one year his medication was reduced (5 mg Olanzapine). He had 20 sessions of cognitive analytic therapy (CAT) over 6 months, finishing in February 2012. He said that the CAT was supportive, but he could not recall learning and using any of the change methods. The first 14-day in-patient admission occurred in 2012, due his parents raising concerns about increasing irritability, erratic behaviour and poor medication compliance. He was initially admitted informally, but due to becoming increasingly hypomanic, was subsequently detained under Section 2, and diagnosed with bipolar affective disorder. A second admission then quickly followed, and this time he was detained under Section 3, presented as very elated in mood, and required a brief PICU transfer due to threatening behaviour towards staff. He spent approximately 6 weeks on the PICU and was treated with Olanzapine 15 mg. The third admission was 9 months after the first, following an episode of significant self-harm. He had lacerated his wrist causing significant tendon and nerve damage, requiring surgical repair. During this 3-month admission, he was also started on Priadel 1-gram (lithium). He had another mental health crisis the following year when he stopped taking his medication, with re-emergence of psychotic symptoms and a short crisis house admission. His Olanzapine was subsequently reduced to 10 mg following the resolution of his psychotic symptoms. He had a further eight sessions of CAT at his own request and was deemed to not require any further therapy on discharge. He said that the further CAT was again supportive, but he could not recall learning and using any change methods. He was discharged to lithium clinic and social inclusions team from Early Intervention for monitoring of his lithium, but did not require care co-ordination. He had a 10-session course of CBT in 2019 for his OCD in the Improving Access to Psychological Therapies service. He said that the CBT was supportive, but he could not recall learning and using any change methods. His medication during

the study was Priadel 1 g ON and Olanzapine 20 mg ON and he had been prescribed both Olanzapine and Priadel consistently since 2012. He has had PRN use of benzodiazepines at times of crisis over the past 10 years.

The presenting problem and the therapy

The presenting problem was the obsessive, intrusive and distressing taboo thoughts which centred on a theme of harming family members. The participant stated he suffered a great deal of guilt and shame about the intrusions. The damage inflicted to his hands and face that occurred on initial admission to the acute ward was his 'punishment' for the intrusive thoughts. The participant stated he had experienced high frequency thoughts, images and urges to harm family members for approximately 6 months. He stated that the intrusions about harming family members drove a range of covert compulsions (e.g. thought cancelling, distraction, controlling his thoughts and self-reassurance) and overt compulsions (e.g. reassurance seeking from others, avoiding family members and trying to prove to his 'goodness' to his family). The OCI score met the criteria for caseness (Foa *et al.*, 2002).

The CBT was split into two phases that were matched to separate wards. The PICU treatment was purely behavioural and followed the Steketee (1993) exposure and response prevention (ERP) approach. A simple formulation was drawn out based on a functional analysis of the OCD pattern, an obsessional hierarchy produced, and psychoeducation provided on typical intrusive thoughts. This enabled the ERP to be explained to the participant in terms of exposure to the intrusions and response prevention to the overt and covert compulsions. The ERP was evaluated in terms of subjective units of guilt and shame to track whether habituation was occurring as the ERP was delivered. Qualified and unqualified nursing staff were trained in ERP so that the participant could practice ERP each day. He worked up the hierarchy when his subjective units of guilt and shame score reduced by 50% in a session. The participant stated that he had not done any ERP in the previous CBT.

The acute ward treatment was cognitive and was informed by the Wilhelm & Steketee (2006) cognitive approach to treating OCD. The participant still completed the ERP between the cognitive sessions, but these sessions focused on his interpretations of the intrusions. The interpretations were typically personality-based ('I am a bad/evil/horrible person'). The interpretations were organised around themes of (1) an inflated sense of responsibility concerning the need to protect people from himself and please others, (2) over-investing in thoughts and treating thoughts as facts, (3) the motivation to always be in control of his thoughts, (4) over-estimation of the threat he posed to others via thought-action fusion, (5) intolerance of uncertainty, and (6) high standards and perfectionism about personal actions, and comparing self with others negatively. During the cognitive element of the CBT, he kept a narrative diary to note down his interpretations and beliefs. This phase also coincided with some home leave and therefore the homework was concerned with applying the cognitive therapy (e.g. completing a behavioural experiment about not pleasing others) in the community. A brief relapse prevention plan was also completed on discharge that contained the key lessons from the therapy, key change strategies and emphasised the role of self-awareness.

Results

The results are in three sections. The first section concerns the idiographic outcomes in terms of the presentation of a time series graph for each idiographic outcome, phase descriptives and the non-overlap analyses of effectiveness. The second section summarises the evaluation of the nomothetic outcomes, and the third concerns the Change Interview results.

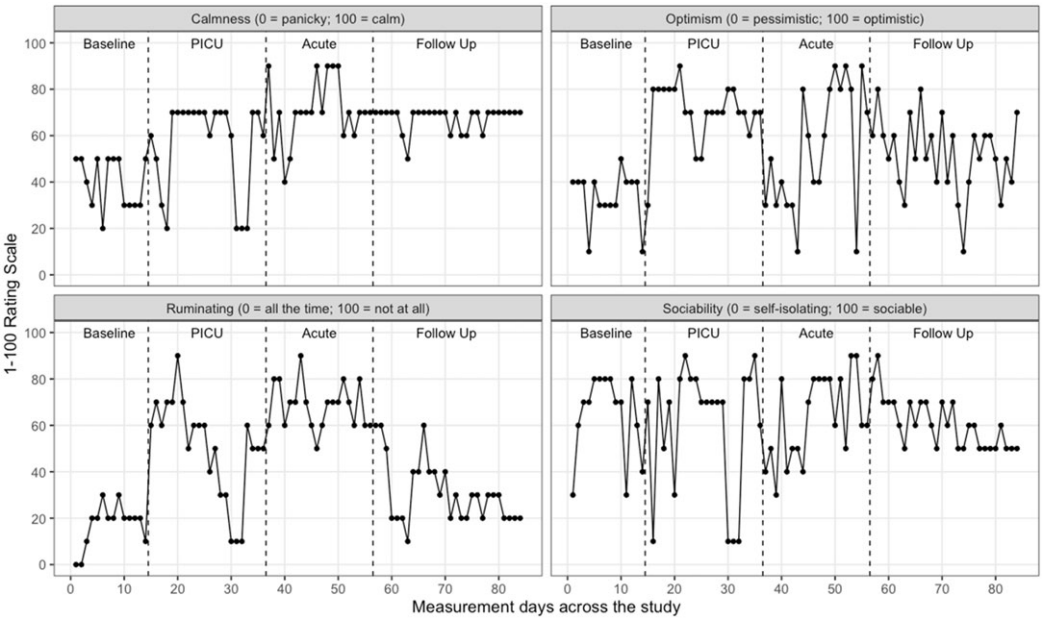

Figure 1. Time series graphs for idiographic outcomes.

Idiographic outcomes

The four time series plots are presented in Fig. 1 where the baseline was also conducted on the PICU. These show improving trends for calmness, optimism and rumination, but not for sociability. There was also some evidence of relapse during follow-up, particularly in terms of rumination. Measures of central tendency are reported in Table 1 and show that the baselines did not need correcting for trend. The phase means illustrate that the behavioural and the cognitive phases were associated with increased calmness and optimism and reduced rumination, but that the follow-up phase contained evidence of some deterioration. Table 2 reports the statistical evaluation of clinical effectiveness. Compared with baseline, both the behavioural and cognitive interventions were an effective intervention for calmness, optimism and rumination. This effect was absent in the sociability measure which had a questionable/ineffective outcome. When the interventions were compared against each other, there were few noticeable differences.

Nomothetic outcomes

These outcomes are reported in Table 3. When the intake scores (i.e. time 1) were compared with the discharge scores (i.e. time 3), a reliable and clinically significant reduction in depression, anxiety and OCD was found. However, the nomothetic outcomes mirror the idiographic outcomes in also evidencing a reliable and clinically significant relapse in depression, anxiety and OCD over the follow-up period.

Change Interview

The patient feedback on the changes created by the therapy is reported in Table 4. Eleven changes were reported and changes were generally rated as surprising, unlikely to have occured without the CBT, with changes also being personally meaningful. Two of the changes were specific to the behavioural work (*understanding/ignoring intrusions* and *withdrawing as an unhelpful behaviour*)

Table 1. Study phase central tendency results on the idiographic outcome measures

Phase	*n*	Mean	*SD*	Median	IQR	Range	Baseline *t*
Calmness							
A	14	40.00	11.09	45	20.0	20–50	0.217 ($p = 0.364$)
B	15	61.33	15.98	70	10.0	20–70	
C	27	64.07	20.24	70	10.0	20–90	
D	28	67.50	5.18	70	0.0	50–70	
Optimism							
A	14	33.57	11.51	40	10.0	10–50	−0.066 ($p = 0.811$)
B	15	69.33	15.34	70	10.0	30–90	
C	27	58.89	24.39	70	40.0	10–90	
D	28	51.79	16.11	50	20.0	10–80	
Ruminating							
A	14	17.14	9.14	20	7.5	0–30	−0.271 ($p = 0.243$)
B	15	58.00	16.12	60	20.0	30–90	
C	27	59.63	20.66	60	15.0	10–90	
D	28	31.07	13.70	30	20.0	10–60	
Sociability							
A	14	64.29	18.28	70	20.0	30–80	−0.012 ($p = 1.000$)
B	15	66.00	20.98	70	10.0	10–90	
C	27	59.26	24.80	60	35.0	10–90	
D	28	60.71	10.86	60	20.0	50–90	

and two were specific to the cognitive work (*belief I am not bad* and *being more self-accepting*). The remainder of changes appeared more non-specific.

Discussion

This SCED was conducted due to the need to evaluate psychological interventions on PICUs and to take the next methodological step in building a PICU SCED evidence base (Cox and Kellett, 2023). Therefore a much more robust study was conducted in which a mixed methods ABCD SCED was performed (Hersen, 1990), in which A was the baseline, B behavioural treatment on a PICU, C cognitive treatment on an acute ward and D follow-up in the community. This was achieved with a patient with an established diagnosis of bipolar affective disorder. The OCD identified at assessment interacted with the bipolar affective disorder when the patient became manic, as the intrusions (and their interpretation) reciprocally increased and magnified as mood became manic. Clinically, the aim was to help the patient manage the intrusions, reduce risk of self-harm and to create a model of self-care that would insulate from future episodes. There were no more incidents of the self-harm which caused the in-patient admission. This seemed to be due to the psychoeducation provided on the characteristics of intrusive obsessions lessening guilt and shame and the associated drive to self-punish. There was evidence that the behavioural and cognitive interventions compared to baseline were effective in improving calmness and optimism and reducing rumination. There were some visually striking discontinuities in the time line of the idiographic outcomes at the point of the phase changes. Interestingly, when the behavioural and the cognitive phases were compared with baseline, they were effective interventions, but when compared with each other, there was little difference. This would suggest that both interventions were effective. The decision to start with the behavioural phase was based on the simplicity of the formulation and the need to implement an intervention that the nursing staff could also deliver under supervision. There was least change shown on the idiographic sociability measure. Whilst this may appear an unusual measure considering the PICU context and the lack of sociability this entails, the patient did want to engage with the MDT, this was seen as productive, and the measure was idiographic and therefore designed by the patient.

Table 2. Non-overlap statistics testing phase changes on idiographic outcome measures (all values are percentages)

Baseline (A) *vs* PICU (B)	Calmness	Optimism	Ruminating	Sociability
NAP	86.9	94.8	99.0	53.8
IRD	79.3	86.2	86.2	17.1
PAND	89.7	93.1	93.1	58.6
PEM	86.7	93.3	100.0	56.7
Tau	73.8	89.5	98.1	7.6
Tau-U	81.4	91.9	88.6	8.1
Tau-BC	73.8	89.5	98.1	7.6
Baseline (A) *vs* acute (C)	**Calmness**	**Optimism**	**Ruminating**	**Sociability**
NAP	85.4	78.8	91.3	47.0
IRD	67.5	45.8	83.7	24.1
PAND	85.4	75.6	92.7	65.9
PEM	85.2	72.2	88.9	42.6
Tau	70.9	57.7	82.5	−6.1
Tau-U	75.1	59.0	77.2	−5.8
Tau-BC	70.9	57.7	82.5	−6.1
PICU (B) *vs* acute (C)	**Calmness**	**Optimism**	**Ruminating**	**Sociability**
NAP	54.2	39.1	56.9	43.7
IRD	22.2	22.2	22.2	22.2
PAND	64.3	64.3	64.3	64.3
PEM	40.7	42.6	59.3	42.6
Tau	8.4	−21.7	13.8	−12.6
Tau-U	0.2	−15.6	27.4	−14.6
Tau-BC	8.4	−21.7	76.5	−12.6
Baseline (A) *vs* follow-up (FU)	**Calmness**	**Optimism**	**Ruminating**	**Sociability**
NAP	99.1	82.5	78.6	36.4
IRD	94.6	46.4	41.1	41.1
PAND	97.6	76.2	73.8	73.8
PEM	100.0	76.8	76.8	21.4
Tau	98.2	65.1	57.1	−27.3
Tau-U	102.3	66.3	52.0	−27.0
Tau-BC	98.2	65.1	57.1	−27.3

<70%, questionable/ineffective treatment; 70–90%, moderately effective treatment; >90%, highly effective treatment (Scruggs & Mastropieri, 1998). NAP, non-overlap of all pairs; IRD, improvement rate difference; PAND, percentage of all non-overlapping data; PEM, percentage exceeding the median; Tau, rank order correlation; Tau-U, changes in trend and level; TAU-BC, changes between behavioural and cognitive phases.

Table 3. Nomothetic outcome measures and analysis of change

	Baseline	End of PICU	End of acute	Follow-up	Reliable change from T1 to T3?	Reliable and clinically significant change from T1 to T3?
PHQ-9 (depression)	21	10	8	20	Yes	Yes
GAD-7 (anxiety)	17	2	7	18	Yes	Yes
Y-BOCS (OCD)	24	9	16	34		
Obsessive Compulsive Inventory (OCD)	59	36	20	28	Yes	Yes

Whilst the Change Interview results suggest that the patient appeared to gain some insight from the therapy and the idiographic and nomothetic outcomes suggest short-term effectiveness, some clinical gains were lost over follow-up time. This particularly was the case on the idiographic rumination measure. The discharge and transfer to the community was a challenging period for the patient and there was evidence of some relapse across the idiographic and nomothetic measures. The patient reported really struggling in the community in the follow-up period and

Table 4. Change Interview results and ratings of expectation, actions and importance

Changes identified	This change was: 1 – expected 3 – neither 5 – surprising	Without therapy: 1 – unlikely to have changed 3 – neither 5 – likely to have changed	Personal importance: 1 – not at all 2 – slightly 3 – moderately 4 – very 5 – extremely
1. Being able to normalise my feelings	4	2	5
2. Being able to ignore and understand intrusions	2	2	3
3. Belief that I am not bad	4	2	5
4. Belief that I can get better	4	3	5
5. Feeling less alone	3	2	5
6. Having techniques for rumination	3	1	4
7. Increased hope	3	3	5
8. Increased fear of punishment (but only after therapy finished)	4	4	5
9. Understanding that withdrawing is an unhelpful behaviour	4	4	5
10. Being more accepting of myself	4	2	4
11. Trusting others	3	2	4

feeling challenged with the tasks of everyday life. He stated that he continued to try to use the therapy and that the relapse would have been more marked if he had not used the coping methods learnt in the therapy. It is interesting that the Change Interview highlighted that the participant reported more non-specific changes than changes directly related to the behavioural and cognitive interventions.

Methodological directions

This has been the first reported quantitative evaluation of a psychological intervention on a PICU using idiographic and nomothetic measurement and was conducted with a case that was a good representation of the ongoing and typically high levels of psychological distress present in this context (Garcia *et al.*, 2005). Use of SCED as an outcome research methodology in in-patient settings appears particularly useful, as it can be flexible to the fact that patients are stepped up and down between PICUs and acute wards (Epstein and Dallery, 2022). Arguably, this detracts from the experimental nature of the study, as the phase changes are reactive to care pathway changes, rather than the pre-specified phase shifts that are experimentally set out in a true SCED. The addition of the interview with the participant showed that the changes experienced were wide ranging, personally important and crucially were unlikely to have occurred without therapy. Future SCED research should try to implement withdrawal designs (i.e. ideally with a neutral baseline), index MDT outcomes in terms of changes to restrictive interventions, have control idiographic measures, integrate measures of treatment integrity, and implement mixed methods approaches. In future SCEDs focusing on specific idiographic measures sequentially during phases (that map onto the mechanisms of the disorder) during pre-specified and experimentally manipulated phases would provide a stronger evaluation of the mechanisms of therapeutic action. This endeavour is a real challenge due to the need to rapidly establish a baseline, and the relevant targets to measure and focus upon might emerge after this and then the opportunity has been missed. Kessler *et al.* (2018) did show 64% reduction in targeted intrusive memories in comparison with 11% in non-targeted intrusions in a within-subjects multiple baseline AB design.

Practical considerations

PICU psychological provision entails organisational work in terms of enabling the MDT staff to implement psychological interventions (British Psychological Society, 2021; Royal College of Psychiatry, 2019). The current study made good use of the nursing staff in the MDT in terms of being able to help the patient regularly practise ERP. The patient could practise across days and shifts and there was an expectation of at least daily practice. This entailed educating the MDT on ERP, to know that the ERP was to enable the patient, through exposure, to approach and stay with the intrusive thoughts, images and urges to harm others. This ran contrary to the normal PICU style of patient management that would be about helping the patient to distract and distance from such thoughts. The ERP was also discussed at the weekly reflective practice sessions that ran on the PICU and this enabled staff's fears about ERP to be heard and resolved. Staff were encouraged in the reflective practice group to trust that habituation would occur and then to test this out with the patient. Staff were encouraged to use the subjective units of shame and guilt method of evaluation to see the evidence that this habituation process was actually happening. Supporting nursing staff in delivering psychological interventions does not have resource implications, it is more about identifying how to better mobilise and utilise existing nursing resources.

It is clear that clinically not every PICU patient is a suitable SCED candidate, just as it is the case that in out-patient settings, not all patients are sufficiently motivated to engage in the intensive data collection required of SCED methods. The controlled and low stimulus environment of the PICU (Bowers *et al.*, 2008) does however lend itself to completing SCED work, and more examples would be welcome. It is hard to estimate the proportion of patients that could contribute SCED data on a PICU, and a feasibility study would be a useful way of exploring this. The ward staff when supported through weekly reflective practice groups and clinical presence on the PICU are typically keen to support and facilitate between-session tasks ('homework') for patients, and readily receive training on psychological interventions. The low-stimulus nature of a PICU means that intensive data collection is possible from the patient perspective (for some) and when the methods of SCED are fully explained, then patients and staff do not appear to perceive a particularly high burden. Feeding back SCED outcomes to staff closes the evaluation cycle and enables deeper team reflection. Clear and easy to understand explanations of the change methods of the psychological interventions are helpful for the MDT staff.

Limitations

The study clearly had some limitations, and these also provide prompts for future research. The study could only explore the impact of a psychological intervention for a single patient (and one diagnosed with bipolar affective disorder and comorbid OCD) and so generalisability to other patients may therefore be poor. The follow-up period was short, and the study would have benefited from an extended follow-up period. There were no formal adherence or competency checks performed on the CBT that was delivered. The number count of daily intrusions was difficult to keep by the patient because of the high frequency of the intrusions, and this was disappointing as it was the measure closest to the mechanistic targets of the CBT. Whilst it is important to generate idiographic measures that are meaningful to the patient, the measures in the current study were quite generic. This meant that the measures did not closely map onto the maintaining mechanisms targeted by the CBT. There is clearly a dance and negotiation when creating idiographic measures between what the patient intuitively wants to track and what the therapist knows will be useful to target. Future studies should try to ensure the design of idiographic measurements that map more directly onto the mechanistic targets of the CBT, but those that are also at the same time easy to understand and collect by the patient (e.g. a simple rating scale of daily intrusion distress might have been more useful in the current study). The Change Interview could have been conducted on completion of each of the treatment phases to gain greater insight into the effect of the behavioural and cognitive interventions.

A key criticism of this paper is that the phases of the study were not experimentally manipulated (Hersen, 1990) and were more a reflection of the care pathway. Indeed, the outcomes could reflect the influence of other treatment factors being present and active on the wards, or just the simple passage of time. Changes in idiographic outcomes tended to occur after the initiation of a new phase (i.e. rather than showing slow improvement over the course of a phase). This may therefore suggest that some non-specific aspect of the change in ward setting (or patient expectancy due to starting a new treatment phase) was responsible for positive effects observed and not the CBT provided.

Conclusions

The methodological flexibility that SCED offers in terms of evaluating in-patient psychological interventions has not translated into consistent usage, and this is particularly the case on PICUs (Cox and Kellett, 2023). This study has been the first of its kind in evaluating direct CBT delivered in a PICU and on an acute ward and used a novel four-phase and mixed methods single case experimental design. SCED as a research design appears particularly practicable within in-patient psychiatric care, as it is adaptive enough to track patients across their in-patient care journey to evaluate interventions that span or differ according to ward context. The needs of the service and the patient need to be balanced with the internal reliability of the SCED in terms of measure design and phase manipulation. Long-term follow-up from psychological interventions delivered on wards is a research need. Clinical trials and practice-based evidence need to be reciprocally developed, and the associated evidence produced then considered in equipoise in the development of a robust evidence base for in-patient psychological treatment.

Data availability statement. The data and the analysis are available from the corresponding author on request.

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Ethical standards. The participant gave their written consent for the study to be reported. Ethical approval for the study was granted as part of a broad ethical approval of SCED work completed in the NHS by the first author (University of Sheffield reference 041077). This study has abided by the Ethical Principles of Psychologists and Code of Conduct as set out by the BABCP and BPS.

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