Integrated Enhanced Cognitive Behavioural (I-CBTE) therapy significantly improves effectiveness of inpatient treatment of anorexia nervosa in real life settings

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Research Article

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Abstract

Background

Inpatient treatment of anorexia nervosa (AN) often results in poor outcomes. To address this, the Oxford service has adapted the multistep enhanced cognitive behavioural (CBTE) treatment model, first developed in Italy, to an NHS setting.

Aim: to evaluate short- and long-term outcomes of Integrated CBTE (I-CBTE) with alternative treatment models in routine clinical practice.

Methods

This is a longitudinal cohort study, involving all adults with AN admitted from a geographical area in England covering a total population of 3.5 million between 2017-2020 using routinely collected data. We compared treatment as usual (TAU) with the Oxford model, which included: 1. short term planned admission with partial weight restoration; 2. I-CBTE (weight restoration defined as BMI 20, combined with 7 weeks day treatment followed by outpatient CBTE); 3. standalone inpatient CBTE.

Primary outcome measures (min. 1 year after discharge from hospital) were defined as: 1. good outcome: BMI>19.5 and no binge purging behaviour; 2. poor outcome: BMI<19.5 and/or binge purging; 3. readmission; or 4. deceased.

Secondary outcomes were BMI on admission and discharge, and length of stay.

Results

212 patients were admitted to 15 specialist units in the UK depending on availability: 120 to Oxford and 92 elsewhere. The mean age: 28.9 (18-60) years, mean BMI: 14.4. There were no significant differences in baseline parameters between patients admitted to different units. Mean discharge BMI was >19.0 in the CBTE groups, 16.0 in the short admission and 17.0 in the TAU groups.

At one year follow up, 70% of patients receiving I-CBTE maintained good outcomes, in contrast with <5% TAU or planned short admissions. Readmission rates were 14.3% vs ~60% ($\chi 2=0.0000$). Standalone CBTE had intermediate outcomes. The main predictor of good long-term outcome was I-CBTE.

Conclusions

Our main finding is that in a real-life setting, I-CBTE has superior short- and long-term outcomes as compared with alternative inpatient treatment models. This was achievable regardless of age, and BMI on admission. Dissemination of I-CBTE across the care pathway has the potential to transform outcomes of inpatient treatment for this high-risk patient population and reduce personal and societal costs.

Plain English Summary

Outcomes for adults requiring inpatient treatment for anorexia nervosa are poor. The aim of this work was to evaluate a recently introduced integrated Cognitive Behavioural Therapy (I-CBTE) in Oxford, adapted from a model first developed in Italy, and to compare outcomes to alternatives. I-CBTE is an innovative approach which combines a time limited, planned admission of 13weeks with the goal of full weight restoration. CBTE treatment is integrated across inpatient, day patient and outpatient settings using a consistent multidisciplinary approach, without any interruptions.

between 2017-2020, we systematically analysed routinely collected data for patients admitted to 15 specialist units from a population of 3.5million in England. We looked at outcomes between admission and discharge, and at one year follow up.

We found that 70% of patients receiving I-CBTE, maintained normal weight at one year after discharge from hospital, without binging or purging behaviours, in contrast with less than 5% of those in alternative programmes that result in partial weight restoration. Readmission rates were 14.3% and ~60% respectively.

Our findings show that continuity and consistency of the I-CBTE approach are fundamental for maintaining good outcomes. Partial weight restoration is ineffective and therefore should be discouraged.

Background

Anorexia nervosa is a difficult to treat mental disorder with high rates of physical and psychiatric morbidities and mortality [1]. International guidelines agree that outpatient psychological treatment should be first line intervention [2, 3]. However, regardless of the treatment model, response rates to outpatient treatment are poor [4, 5], and a significant proportion of patients remain chronically ill or require more intensive treatment [6, 7]. The evidence base for inpatient treatment is weak, and consequently there are significant international variations in practices [8, 9]. The availability of specialist inpatient treatment is dependent on national guidelines and funding arrangements in each country often resulting in poor access and a crisis in care [10].

In the UK, admission tends to be the last resort for patients whose physical health is severely compromised. Hospital admissions in England of people with eating disorders have increased from 4,849 in 2007/8 to 23,954 in 2020/21 [11]. Approximately 70% of these are adults. In the UK, NHS England (NHSE) commissions 455 specialist adult eating disorder beds. Approximately half of these are provided by the independent sector, and the remaining by multiple NHS providers. Owing to the shortage of specialist beds in the UK, many patients have to wait for admission until they are gravely ill, and this situation has worsened since the pandemic [12]. This practice may explain an average length of stay that is longer than in other countries [13-16].

Cohort studies consistently show that while most patients gain weight in a hospital setting [14, 17, 18], the core eating disorder psychopathology often remains unresolved and, outcomes are unsatisfactory. In

the UK, the majority of adult patients are discharged below normal weight [13, 14], and there are high relapse and mortality rates [19-21]. However, this can be viewed as a chicken and egg dilemma. If only the most severely ill patients are admitted to hospital, it should not be surprising that recovery rates are lower than for those responding to outpatient treatment alone. While there is increasing recognition that early intervention has better outcomes [22], this principle has been not been applied to inpatient treatment. Most adults requiring specialist inpatient treatment have been ill for years, and many have had several previous hospitalisations. The needs of this patient population should not be neglected, as they have the highest risk of premature mortality [20]. It is possible that restricting admissions to those, who are severely compromised, and discharging patients at a low weight contributes to poor outcomes and causes harm [23, 24]. Normal discharge weight is a good predictor of long-term outcomes [23-26].

In England, funding arrangements have recently shifted from national commissioning of specialist services to regional NHS collaborations, with the intention of transforming care pathways for the local populations to improve outcomes and cost savings [27]. In 2018, the Healthy Outcomes for People with Eating Disorders Provider Collaborative (HOPE PC) was established bringing together five neighbouring counties in England providing specialist eating disorder services for adults. As part of this project, there was an agreement to compare a new service model in Oxford, which has developed an integrated, stepped care model using enhanced cognitive behavioural therapy CBTE (I-CBTE) adapting Dalle Grave's model [28] for the NHS, with treatment as usual (TAU) elsewhere in the UK.

In this paper, we aim to compare short- and long-term (1 year post discharge) outcomes of patients with anorexia nervosa admitted to specialist inpatient units from the HOPE PC footprint using routinely collected data.

Methods

This is a longitudinal cohort study, involving all patients with eating disorders admitted from the HOPE PC geographical footprint, which covers a total population of 3.5 million. Routine data collection included age, demographics, diagnosis, BMI on admission and discharge and long-term outcomes. This provided an opportunity for comparison between different models of inpatient treatment and type of aftercare (see Flow diagram).

Inclusion criteria: all patients with an ICD-11 diagnosis of anorexia nervosa and related disorders who were admitted to a specialist inpatient unit following a referral to the HOPE PC single point of access between 2018- and December 2020, and patients who were offered I-CBTE since the establishment of the Oxford model in 2017.

Exclusion criteria: patients older than 60 years of age.

Categorical outcomes at minimum 1 year after discharge from hospital was used as the primary measure;

1. Good outcome: the patient is at normal weight (BMI>19.5) and no binge purging (either discharged from outpatient services or completing treatment).
2. Poor outcome: patient remains <19.5 and/or binge purging (regardless of whether still open to specialist services or discharged to primary care)
3. Readmission.
4. Deceased.

Secondary outcomes were BMI on admission and discharge, and length of stay.

Ethics: The study was approved by Oxford Health Foundation Trust Audit department as a service evaluation study. As only routinely collected data were used, there was no requirement for individual patient consent. All data were kept on a secure server.

Statistics

We analysed the data with SPSS 22, using descriptive statistics, Chi-squire test for categorical variables, Independent T-test and ANOVA for continuous variables, and linear regression for identifying main predictors of outcomes.

Settings

The HOPE Provider Collaborative

The HOPE PC was established in July 2018. It includes NHS organisations covering five neighbouring counties in England, and the independent Priory Group for additional inpatient provision. The total population of the geographical footprint is 3.5 million. The main goal of the network was to bring together several organisations providing specialist inpatient and community services for adults with eating disorders. The PC introduced a joined up approach to admissions across the geographical footprint by establishing a single point of access for referrals [29]. Referrals and outcomes have been systematically monitored since July 2018 for the whole geographical area.

Treatment options

Treatment as usual: current inpatient practices in England

International guidelines vary regarding the optimal inpatient treatment models [3, 8] owing to the limited evidence base. Current UK inpatient treatment programmes broadly follow the NHSE Standard Contract for Specialised Eating Disorder services and the NICE guidelines [2, 30]. These programmes include an

eclectic combination of multidisciplinary interventions, including expert re-feeding with medical monitoring, psychoeducation, and a range of psychological interventions, such as motivational enhancement therapy, CBT, cognitive analytic therapy, inter-personal therapy, focal psychodynamic, and family interventions focused on the eating disorder, as well as occupational therapy, social skills programmes, and recreational activities. The potential weakness of these programmes is that there is often a risk of giving conflicting messages to the patient. For example, if the medical and nursing team focus on weight restoration, while the psychologist delivers non-directive therapy at the same time, this would cause direct conflict between different therapeutic models [28]. This is unhelpful in a patient population with a high level of ambivalence towards treatment and recovery. This may explain why disengagement and self-discharge are common – as much 60% in some studies [31]

NHSE contract recommends three types of admissions:

1. Urgent/unplanned admissions with 'modest weight restoration'
2. Symptom recovery admissions: weight restoration to normal weight and improved eating behaviours and psychological understanding
3. Planned short term admission for 'medical stabilisation' or symptom interruption

It is important to note that the NHSE contract is based on expert opinion rather than robust evidence and that it is interpreted differently by different providers. The multiple recommended psychological interventions were developed independently in outpatient settings and have never been tested in combination in inpatient settings. The content of TAU differs across inpatient units and even across time within the same unit. So, it should not be entirely surprising that despite the implementation of the national contract, outcomes of inpatient treatment remain poor; and the number of people requiring hospitalisation with eating disorders has been increasing, often due to readmissions.[32] Furthermore, the outcomes of the three recommended types of admission have never been evaluated.

'Medical stabilisation' admissions

Short admissions (planned or unplanned) are usually labelled as 'medical stabilisation' both in the UK and elsewhere. However, interpretation of what 'medical stabilisation' means in this context varies widely. For example, patients presenting to A&E departments with life threatening electrolyte imbalances may be temporarily 'stabilised' by intravenous replacement, but unless the eating disorder is treated, the crisis will rapidly recur. Commonly, patients with severe and enduring anorexia are admitted for a time-limited 'medical stabilisation admission' of a few weeks (e.g. to improve the BMI from 12 to 14, without any individual psychological treatment). The effectiveness of these practices has never been formally evaluated [33]. While they can help to keep the patient alive and reduce the cost of prolonged hospitalisation, whether this approach inadvertently contributes to the maintenance of the illness is uncertain: the term 'medical stabilisation' gives the impression to the patient and carers that prolonged

extreme malnutrition can be 'stable', when in fact it guarantees a gradual decline of their physical and mental health.

'Symptom recovery' admissions

'Symptom recovery' admission is usually offered to the 'motivated' patient to achieve weight restoration 'to normal weight or weight at which [the patient] can reliably continue independent weight restoration/ weight maintenance with less intensive input', and a 'resolution or marked improvement in eating disorder behaviours'. The reference to the 'motivated' patient implies that motivation to change is inherent to the individual, rather than the task of an effective treatment. Normalisation of weight can take a long time for an extremely malnourished patient, particularly if the weight restoration is slow (NICE guidelines recommend 0.5-1kg/week). If the person needs to gain 10 to 20 kg in weight to reach a minimum healthy BMI, then admission can take between 6-10 months.

Transition and care coordination

Although most guidelines recommend clear care planning in preparation for admission and for discharge [2, 34], there is limited guidance as to the details of how this should be implemented. Most patients find unplanned admissions and interruptions in therapy as well as changes in therapeutic models traumatic, especially at a time when the risk of relapse is the highest.

The Oxford Model

To address these challenges, the 'Oxford model' was developed in 2017, adapting a whole system treatment approach across the care pathway using CBTE. Over the last 15 years, Ricardo Dalle Grave's team in Italy, in collaboration with Christopher Fairburn in Oxford, has adapted CBTE, which was originally developed as one-to-one individual therapy [35], to a new, whole-team, stepped care treatment programme for people with severe eating disorders requiring intensive treatment [28, 36, 37]. The novelty of this programme is the clear theoretical underpinning of treatment, and continuity of evidence based psychological treatment throughout the inpatient, day patient and community pathways, in contrast with the traditional model enshrined in the NHSE contract.

The CBT-E treatment fosters therapeutic optimism, and has four main goals:

1. To engage patients in the treatment and involve them actively in the process of change;
2. To remove the eating disorder psychopathology, i.e. dietary restraint and restriction (and low weight), extreme weight-control behaviours, and preoccupation with shape, weight and eating;
3. To correct the mechanisms maintaining the eating disorder psychopathology;
4. To ensure lasting change.

Dalle Grave has published two manuals [28, 36] and several papers to describe the method and reported good outcomes in different patient populations [38-40]. For full details, we refer to the published literature. Briefly: the CBT-E intensive treatment programme is time limited to 13 weeks inpatient treatment, followed up by 7 weeks day treatment for stabilisation of normal weight and ongoing individual CBTE treatment afterwards lasting for 40 weeks in total, (in line with the length of treatment recommended by NICE).[2]

Given the differences between the health care systems and legal frameworks of the UK and Italy, we had to adjust the programme for the NHS. The Garda unit in Italy is a private hospital that only admits patients who, after preparation, consent to the full programme, while NHS services are required to admit patients who consent only to partial weight restoration or who require compulsory admission and treatment.

As a result, we introduced two pathways:

1. I-CBTE: full weight restoration with time limited admission (12-13 weeks) and 7 weeks stepped down day treatment, followed by outpatient CBTE replicating the Garda model.
2. 'Crisis management' admission for those patients who do not consent to I-CBTE, but are not detainable. This was due to having to comply with NHSE contract that includes planned short-term admissions.

Detained patients were encouraged to choose full weight restoration and were offered the whole programme.

The following changes were introduced in Oxford as part of transforming the service from a treatment as usual service to an intensive CBTE treatment programme.

Preparation for admission

Preparation for admission is fundamental for successful inpatient treatment, even for the physically compromised patient [28]. This is because a high level of ambivalence and fear towards change and recovery is inherent in anorexia nervosa. Furthermore, the control of diet and weight and shape is central to the psychopathology, and unless the patient is fully prepared for the treatment, premature discharge is a high risk. Ideally, patients should start psychological treatment before admission, or – if this is not available – have a clinician, who can provide continuity between inpatient and outpatient treatment.

We introduced a multidisciplinary/multiagency admission planning meeting for all patients regardless of severity or legal status. The purpose of this meeting is to help the person consider treatment options, benefits and risks related to both options and to encourage them to overcome their eating disorder. This approach aims to empower the patient: encouraging a sense of control at a time when feelings of loss of control are common and act as a barrier to accepting care; and fostering a sense of autonomy as well as therapeutic alliance, collaboration and developing trust with the inpatient team. The multidisciplinary

team introduces the treatment programme on the unit and helps the patient to make an informed decision from the two time-limited options. The treatment team always strongly encourages the patient to sign up for the full I-CBTE programme, explaining that research shows that recovery rates are much better than with crisis admission or TAU. In our experience, patients and carers value this evidence-based information, and it helps them make informed decisions, even if they are highly ambivalent about the admission. Typically, the discharge date can be agreed before admission. This helps all parties to remain focussed on admission goals and to plan for continuity of treatment after discharge. The patient and the carers have an opportunity to visit the unit and receive written information to help familiarise themselves with the treatment available. This is essential for managing anxiety and to start therapeutic engagement. Dalle Grave recommends several sessions for this engagement; however, due to resource limitations, we have only been able to offer one meeting for most patients. Feedback has been positive, although some clearly require more than one session to sign up for full treatment, and we are planning to address this in the next steps of service development.

Since the pandemic, these meetings have been remote. The technology allowed the inclusion of multiple stakeholders, including the family, community teams, and GP/other agencies.

‘Crisis management’ admission

In Oxford, we introduced the term ‘crisis management’ for planned short admissions with partial weight restoration. This was to prevent inadvertently reinforcing the psychopathology, and misleading patients and carers, who often interpret ‘medical stabilisation’ literally. If someone is discharged when still malnourished, they may be over an immediate crisis, but are not stable, as chronic malnutrition is progressively harmful. The length of stay is usually from 6 to 8 weeks, the goal being to help the patient reach a BMI of minimum 15, or 6-8kg of weight gain and symptom interruption. Calculating and offering a discharge date at the admission planning meeting reduces anxiety and provides a sense of control, and intensive aftercare is recommended to continue with progress.

Weight restoration

We also reviewed the weight restoration programme. This required a culture change among staff across the care pathway and consistent messages to patients and carers. The rate of expected weight gain in the UK is 0.5-1 kg per week in a hospital setting, and this is followed by most inpatient services. Prior to the introduction of I-CBTE, we also followed this practice and used very sensitive medical grade scales on the unit, which recorded minuscule changes in weight. However, this inadvertently reinforced the patient’s preoccupation with minor details. We changed to 0.5 kg scale accuracy and faster weight restoration (1-1.5 kg/week), as recommended by Dalle Grave [28]. Both of these changes were well received when the rationale was explained, and they improved the rate of weight restoration and length of stay. Collaborative weighing and interpretation of the weight graphs are an important part of CBTE. It is essential that the patient understands the need for weight restoration: malnutrition is one of the principal maintaining factors of anorexia nervosa [35]. While it may take time, most patients recognise that

reversal of malnutrition is a necessary step towards recovery. The dietetic team was crucial in implementing these changes, helping to manage the patients' distress in the dining room using quality improvement methodology [41].

Psychological treatment

We developed a rolling 20-week multidisciplinary group programme following CBTE principles and offered individual formulation for all patients. The individualised CBTE formulation for every patient considers all maintaining factors (e.g., physical and mental health co-morbidities, other social care factors, such as housing, education/employment) and guides the role of each team member as to how best to support the patient. All members of the team work in a co-ordinated and collaborative approach with the patient to address their individual maintaining factors through the setting of weekly goals and the ongoing development of new skills and strategies.

Prior to the pandemic, we were able to deliver a 7 week day-programme and individual psychological treatment for patients on the I-CBTE pathway after discharge. People on the crisis management pathway received supportive management after discharge in their respective community teams.

The impact of the pandemic on the implementation of I-CBTE

Unfortunately, since the onset of the pandemic, most day services have closed or have had to run with reduced capacity due to infection control and staffing challenges and patients have been unable to access ongoing individual psychological therapy after discharge but have been placed on lengthy waiting lists for therapy owing to resource limitations.

Despite these challenges, the inpatient team maintained the key multidisciplinary components of CBTE, as described above, including a detailed I-CBTE formulation. This situation has created a natural experiment to compare the standalone inpatient CBTE with the I-CBTE integrated stepped care model, and we included this group in our analysis.

Results

Demographics:

The mean age was 28.9 years (17.1-60). Forty-seven percent of patients referred for admission were young adults between 17-25 years (Figure 1). Ninety-seven percent were female, and 99% had a primary diagnosis of ICD-11 anorexia nervosa, with the remaining patients had atypical anorexia nervosa.

There was a high rate of comorbidities: most commonly depression, anxiety disorders, autism spectrum disorder, or personality disorder. Seventy five percent were informal.

In total, 212 patients were admitted between 2017-2020 to 15 different specialist eating disorder units in England and Scotland: 120 to Oxford, 34 to Marlborough, 16 to Priory in area, 29 to out-of-area independent units, and 13 to out-of-area NHS units.

Table 1 shows short term outcomes between admission and discharge for the Oxford model compared with TAU elsewhere. There were no significant differences between the patients' age and admission BMIs in different services. Discharge BMI and length of stay were significantly better in Oxford than elsewhere.

Breaking it down to treatment models, the shorter length of stay in Oxford is primarily due to the introduction of the 'crisis' admissions (Table 2). The length of stay for I-CBTE, and inpatient CBTE was similar to TAU elsewhere; however, the discharge BMI was significantly better in the CBTE groups. 53% of patients in the I-CBTE, and 44% in the inpatient CBTE group had a discharge BMI within the normal range (BMI>19.5), as opposed to only 7% in the TAU group.

Table 1: Comparison of short-term outcomes between the Oxford model and Treatment as usual (admission and discharge)

	Oxford model vs TAU	Mean	Std. Deviation	Independent T-test p=
Age (years)	Oxford model	29.5	10.5	0.11
	TAU	27.4	8.7	
Admission BMI	Oxford model	14.4	1.7	0.982
	TAU	14.4	1.7	
Discharge BMI	Oxford model	18.3	2.1	0.00000
	TAU	17.0	2.0	
Length of stay	Oxford model	95.6	64.6	0.002
	TAU	128.7	88.9	

Table 2. Differences in short term outcomes between different treatment models

		Mean	95% Confidence Interval for Mean		ANOVA P=
			Lower Bound	Upper Bound	
Age (years)	I-CBTE	27.2	23.9	30.6	0.013
	CBTE-inpatient only	28.2	25.3	31.2	
	Crisis management	33.3	29.6	36.9	
	TAU	27.4	25.6	29.2	
Admission BMI	I-CBTE	14.6	14.1	15.0	0.74
	CBTE-inpatient only	14.6	14.0	15.1	
	Crisis management	14.2	13.6	14.7	
	TAU	14.4	14.1	14.8	
Discharge BMI	I-CBTE	19.7	19.4	20.0	0.0000000
	CBTE-inpatient only	19.0	18.5	19.5	
	Crisis management	16.0	15.6	16.3	
	TAU	17.0	16.6	17.4	
Length of stay	I-CBTE	125.4	111.4	139.3	0.0000005
	CBTE-inpatient only	106.4	84.7	128.0	
	Crisis management	50.1	39.6	60.7	
	TAU	128.7	110.2	147.2	

Minimum 1-year outcome data were available for 166 patients. I-CBTE was highly significantly better in helping people to maintain recovery over time (Figure 2). Seventy percent of patients who received I-CBTE maintained good outcomes for a minimum of one year, while only 27% who received standalone inpatient CBTE and only 3-4% of those receiving crisis management admission or TAU achieved this. This benefit was not dependent on age or severity of malnutrition on admission. Patients with good long-term outcome reached a mean discharge BMI of 19.9 and continued with I-CBTE after discharge. Readmission rates were much lower in the I-CBTE group than in the others.

These findings show that although weight restoration to normal weight is essential for good outcomes, it is insufficient in itself: integrated CBTE through a stepping down to day patient and ongoing individual psychological treatment is needed to ensure that changes are lasting.

There was no significant difference between long-term outcomes of crisis admission vs TAU, despite the much longer length of stay in the latter. Readmission rates were approximately 60% and a third of patients remained chronically malnourished in these groups, which suggests poor outcomes for people who are only partially weight restored during inpatient treatment.

Patient comment:

I was admitted to Cotswold House EDU at the Warneford Hospital in Oxford, in August 2017. I had been suffering from a complex, co-morbid eating disorder for nearly 2 decades; I was locked away in psychiatric institutions as a "treatment resistant" "revolving door patient". The Oxford team provided a holistic, inclusive, ground-breaking and compassionate care with the I-CBTE model. I was able to work through all the issues and trauma of my long, terrible journey. For the first time ever, I reached a healthy weight. This helped me to think more clearly. I was encouraged to use my creativity, to imagine a new life. This was daunting, but exciting. On my discharge, I had support in the community, which helped me practice what I had learned in hospital, and allowed my body to finish reaching its healthy weight. My illness was not really about weight, but learning to accept my body, whatever its weight, was essential. Now, I have formed a completely new life for myself, which is nothing to do with eating disorders. This is the epitome of my recovery, the outcome of my I-CBTE treatment: I am successful, creative, needed. I will always be incredibly grateful to the multidisciplinary team in Oxford for their lifechanging care.

Linear regression showed that the only significant predictor of outcome was the treatment model rather than age, admission BMI, or length of stay (Table 3).

Table 3. Predictors of long-term outcome (Linear regression)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1.58	1	1.58	3.14	0.086
Age	0.40	1	0.40	0.80	0.378
Treatment model	6.96	3	2.32	5.15	0.003
Admission BMI	52.060	87	0.60	1.36	0.115
Discharge BMI	0.302	1	0.30	0.60	0.443
Length of stay	1.06	1	1.06	2.11	0.156

Five patients of the cohort (3%, aged 20-45 years) died following discharge from hospital. Three patients died within 6 months and two up to 4 years after discharge. All had a history of compulsory admission/treatment. All had significant comorbidities: one person had severe inflammatory bowel disease, one had obsessive compulsive disorder, two had substance misuse, and three had previously attempted suicide. The cause of death was suicide in one case, two patients died of physical complications of the eating disorder, and two deaths were undetermined. All five patients died during the pandemic, when outpatient face to face treatment was disrupted.

Discussion

In this paper we examined short- and long-term outcomes of different inpatient treatment approaches to adults with anorexia nervosa from a large UK geographical area in routine clinical practice. The establishment of the HOPE PC created an opportunity to compare the 'Oxford model' with TAU elsewhere.

Our main finding is that I-CBTE is superior in terms of both short- and long-term outcomes as compared with alternative inpatient treatment models in real life settings. Seventy percent of patients who received I-CBTE during the whole care pathway achieved good outcomes one year after discharge from hospital, as compared with less than 5% of the patients in the TAU or crisis pathways. These excellent outcomes were achievable regardless of the patient's age or severity of malnutrition, and this finding gives hope for people who have been chronically ill. This is consistent with previous studies of CBTE in anorexia nervosa [39, 42]. The main predictor of good outcome was I-CBTE, which included a combination of full weight restoration and a time-limited, step care approach, with ongoing CBTE throughout inpatient, day treatment and outpatient settings, without any interruption or gaps in treatment and with support for the patient to address the maintaining factors of their eating disorder and to make lasting changes.

These results are important replications of Dalle Grave's findings [37, 39, 43] in routine NHS practice, despite the significant differences between the healthcare systems and staffing levels in England and Italy. The Garda unit only admits patients who, after preparation, consent to the full programme, whilst NHS specialist services are required to admit everyone who needs inpatient treatment, regardless of whether they consent to treatment or not. At the beginning of the adaptation of the I-CBTE model in Oxford there was considerable uncertainty as to whether patients who do not consent would have a negative impact on the engagement and progress of others treated on the unit at the same time. While at times this needed careful management by the team, we found that the individual admission planning, clear goal-oriented admission, and the consistent and integrated multidisciplinary approach, helped patients to focus on their own treatment. We also replicated previous findings, which showed that good outcome is related to normalisation of BMI on discharge [26].

The biggest challenge to implementation in the NHS was an insufficient number of therapists to provide the integrated CBTE psychological treatment through the care pathway. Furthermore, the pandemic dramatically reduced the availability of day hospital provision. When integrated step-care was not

achievable owing to insufficient resources, we found that although inpatient CBTE had better short-term outcomes than TAU, fewer patients were able sustain progress, and readmission rates were the same. This shows that integration and continuity of care are essential for maintaining good outcomes after discharge. The importance of managing transitions well and coordinating care between inpatient and community services is emphasised in multiple guidelines [8, 34, 44], but there are only a few studies exploring the effects of the quality and type of aftercare following discharge, and the impact of integration of psychological treatment across the care pathway.[45, 46]. The main strength of I-CBTE is the clarity and consistency and the continuity of care when the patient is stepping down from inpatient treatment.

Our findings regarding TAU are consistent with previous research. A 2013 UK multicentre cohort study of short-term outcomes of hospital treatment including 137 adults with anorexia nervosa, reported a mean admission BMI of 14, and discharge BMI of 17.3. Only 22% patients were discharged at BMI>19 despite the lengthy admissions (average length of stay for inpatient treatment was 184 days and 126 days for day treatment) [14]. A study in Scotland reported comparable results [13]. Our sample of 92 patients treated in 15 different units around the UK had similar outcomes: only a small proportion of patients were discharged at normal weight and less than 10% achieved good outcomes at one year after discharge. This suggests that there has been limited progress since 2013 in inpatient treatment of adults with anorexia nervosa in the UK, apart from shortening the mean length of stay.[15]

We have clearly demonstrated that partial weight restoration programmes are ineffective regardless of the length of stay. Short term planned admissions and TAU had poor outcomes with low recovery rates and recurrent admissions. To our knowledge, there are no other long term outcome studies in the UK regarding short-term hospitalization or partial weight restoration. Short admissions are likely to be more effective if they are part of an integrated care programme, but in routine practice this is difficult to ensure. This would mirror the principle of crisis admissions for other long-term conditions, such as diabetes: correcting blood sugar level in hospital can be lifesaving, but it would be ineffective in the long term without the necessary aftercare.

Trials in adolescent populations, such as short-term hospitalisation combined with family based treatment,[47] or day hospital,[48] showed positive results, which is consistent with our finding about the importance of ongoing integrated care after inpatient treatment. Unfortunately, gaps in service provision remain common, and increase the risk [49].

The tragic death of 5 patients in the cohort highlights the high risk of mortality in this patient population and is consistent with previous research.[21, 50, 51] All of the deceased patients had a history of compulsory admission, which is an indication of severity and could be the result of delayed referrals, and all had severe comorbidities. Furthermore, all of them died during the pandemic, which inevitably had an impact on the aftercare arrangements in the relevant community services. Further work is required to elicit modifiable risk factors for preventing mortality.

Strengths and limitations

This is the first large dataset in the UK which has allowed systematic comparison of short- and long-term outcomes of different adult inpatient treatment approaches for anorexia nervosa from a population of 3.5 million. We analysed routinely collected data for patients admitted to 19 specialist units in England and Scotland and had very few exclusion criteria. We therefore believe that our findings are generalizable to UK practices.

There were a number of limitations. Data concerning eating disorder psychopathology were not systematically available and therefore not included in this paper. Although shared outcome measures were agreed among PC partners, most units struggled to return data collection consistently, so we had to rely on the most commonly available robust data. However, BMI and normalisation of weight is a good indicator of outcome in anorexia nervosa[26, 52]; and the rate of readmission and chronic malnutrition are robust outcomes and indicators of ongoing psychopathology.

This was a longitudinal cohort study, and therefore the comparison between the different inpatient models was not based on randomisation. However, there were no baseline differences between the Oxford model vs TAU and patients were admitted based on bed availability in the UK rather than personal preference. Randomised controlled trials of complex interventions for a high-risk population also have limitations [53]: as they rely on informed consent and therefore exclude the most complex patients, and given the national shortage of beds, it would not have been practicable. The mean age in the crisis admission group was higher. It will be important to explore how to engage this more chronic patient group work towards recovery.

Recommendations

- Based on our results we recommend the wider implementation of I-CBTE for intensive treatment of anorexia nervosa. Training resources, such as manuals and online training are easily accessible and relevant to multidisciplinary teams to provide a cohesive approach.
- Funding arrangements need to align and support a stepped and integrated care pathway to achieve optimal outcomes. While there is national policy to support this, it is often lacking in practice in the frontline and needs to be prioritised.
- A national audit of inpatient treatment, would help to improve transparency, develop the evidence base, and compare outcomes of different models. This should include monitoring admission and discharge parameters, length of stay, as well as transition of care and relapse rates. Similar calls have been made in the US [54] where there is a proliferation of for-profit organisations providing residential treatment. This is also essential in the UK where approximately 50% of beds are provided by the independent sector.
- A national register of deaths owing to eating disorders – similar to the National Confidential Inquiry [55] – would be important to reduce the risk of mortality in this patient population.

- Further research is needed on improving care pathways to help patients achieve sustained recovery after inpatient treatment [56]. The cost-effectiveness of integrated models of care as opposed TAU needs to be evaluated building on existing research [57].

Conclusions And Clinical Implications

- We have shown that the I-CBTE model which was developed in Italy is robust and applicable to eating disorder services elsewhere. The treatment is highly collaborative, least restrictive, and treats the patients as adults. It supports them to work towards recovery and to develop autonomy based on their individual formulation, developing behavioural change and addressing their maintaining factors to achieve lasting changes.
- The short- and long-term outcomes of I-CBTE were superior to alternative models of inpatient treatment and can be recommended for the NHS.
- An integrated stepped care model is essential to prevent readmissions and optimise long term outcomes.
- The key components of successful outcomes include engagement, preparation for admission, multidisciplinary working, weight restoration, and gradual stepping down intensity with ongoing CBTE treatment.

Declarations

Ethics approval and consent to participate:

This work was approved by Oxford Health Foundation Trust Audit Department as a service evaluation project.

Consent for publication:

Not applicable as only routinely collected data were analysed.

Availability of supporting data:

Available on request from the corresponding author.

Competing interests:

None

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Authors' contributions

- AA and AI developed the initial idea, SR, DV helped with the design and datacollection, SR, DV, ET, LG helped implement the CBTE programme in Oxford, AA analysed the data. AI and AA wrote the first draft, all authors contributed to the final draft.

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Figures

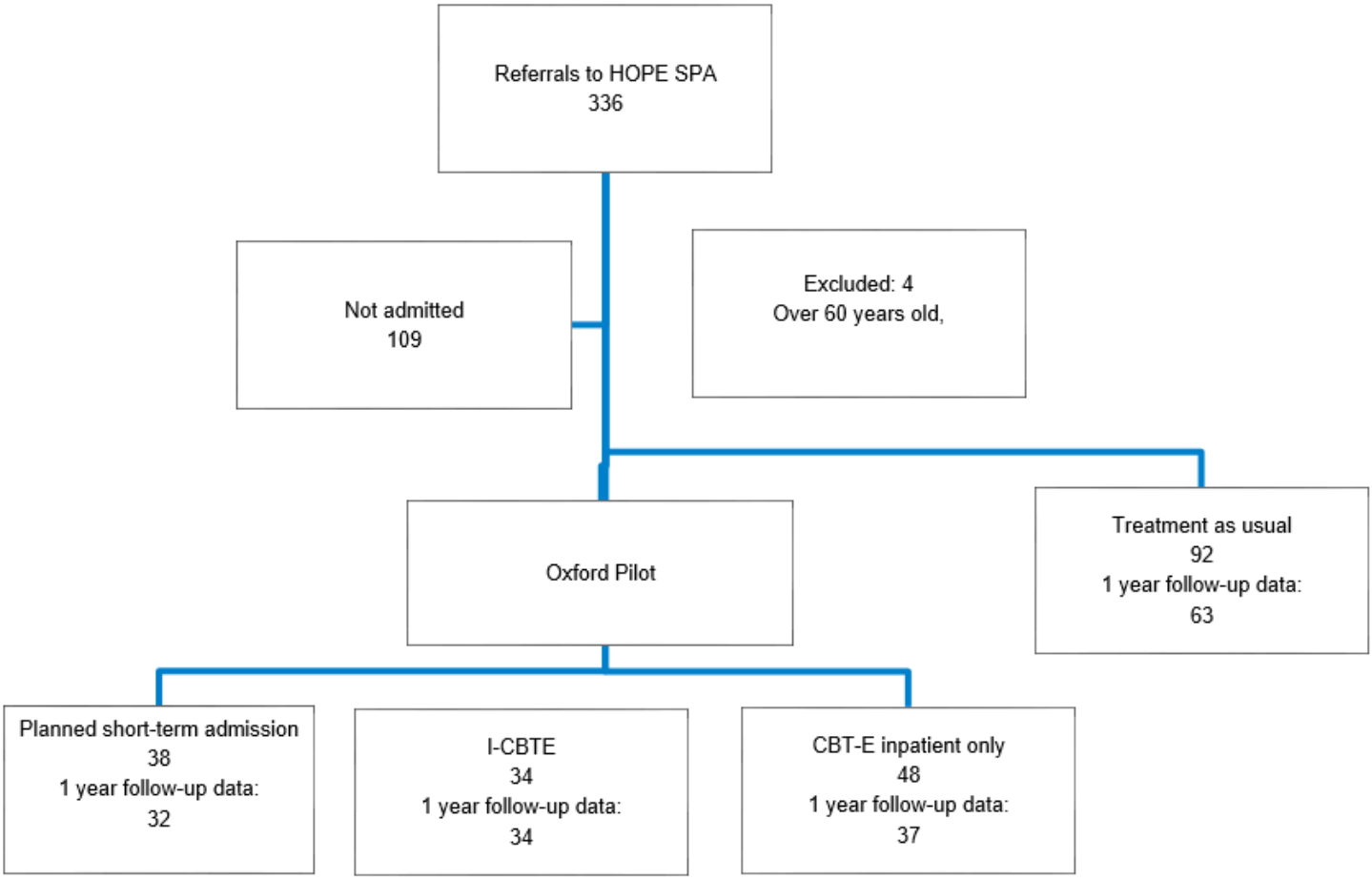

Figure 1

Flow diagram of analysis

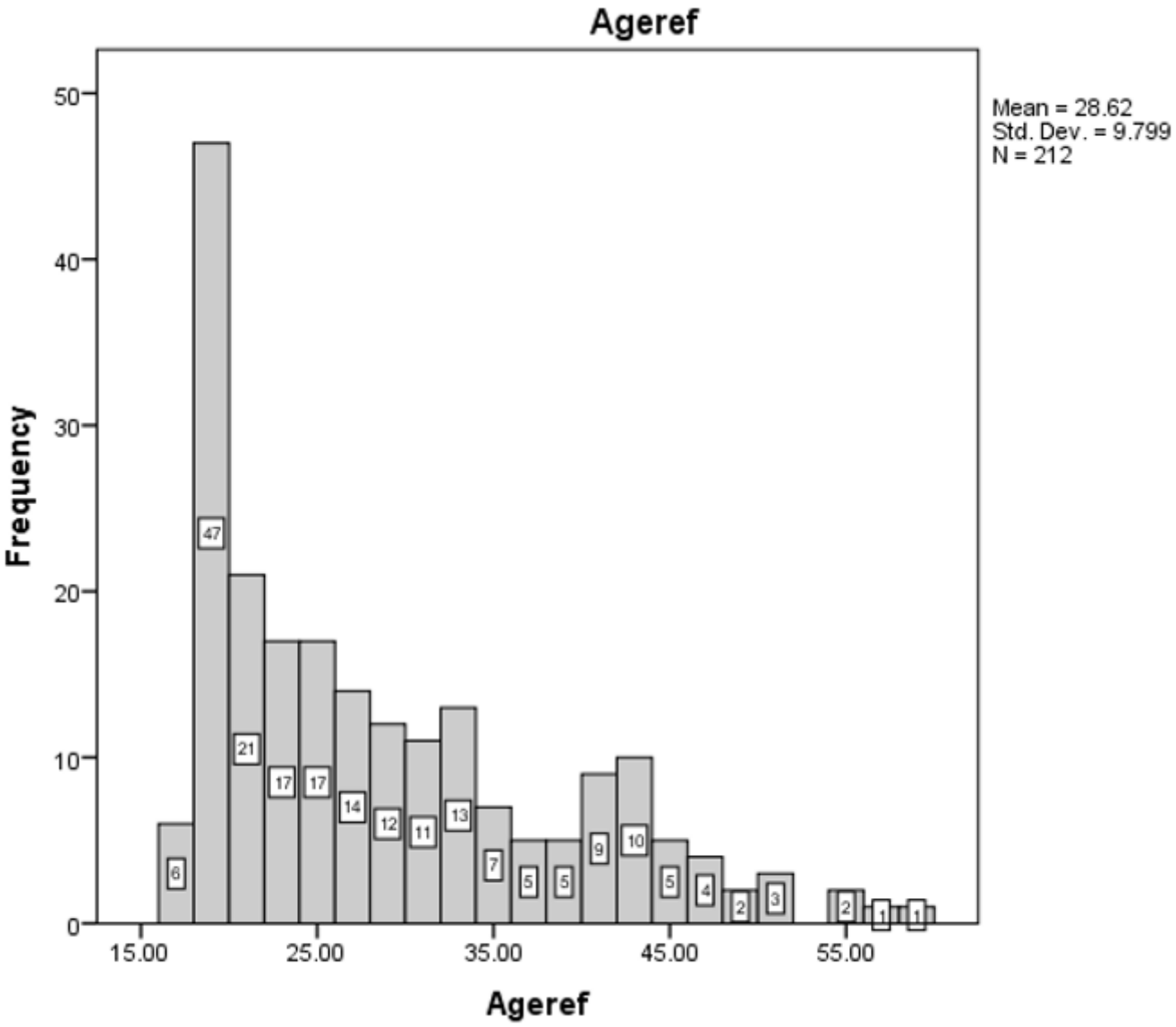

Figure 2

Age distribution

Figure 3

Long term outcomes (Chi square: 0.0000)