

The short term effectiveness of day treatment for eating disorders in reducing psychosocial impairment: utilizing the clinical impairment assessment in routine practice

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Abstract

Purpose – *The purpose of this paper is to investigate the effectiveness of a day treatment programme (DTP) in reducing psychosocial impairment, changing attitudes, restoring body-weight and decreasing binge/vomit symptoms among 52 individuals (aged 16+) with eating disorders. It was hypothesized that day treatment would result in improvements across all variables measured.*

Design/methodology/approach – *In a within-participants design, demographic, physiological and psychological measures were taken on admission to and at discharge from a DTP in the UK. Quantitative outcomes were analysed.*

Findings – *In total, 40 participants were considered to have received an adequate dose of the DTP, having completed at least four weeks on the programme. Analyses supported all hypotheses, with all improvements being statistically significant. Large effect sizes were evident for all outcomes across the whole sample other than shape concern attitudes and weight concern attitudes, which reduced with moderate and moderate-to-large effect sizes, respectively.*

Originality/value – *This study provides new evidence of the effectiveness of day treatment in reducing psychosocial impairment resulting from eating disorder psychopathology. It remains for future research to determine whether these outcomes can be sustained over the longer term.*

Keywords *Quantitative, Anorexia nervosa, Bulimia nervosa, Effectiveness, Outcome, Binge eating disorder, Day treatment, Eating disorder, Day programme, Partial hospital*

Paper type *Research paper*

Introduction

Background

Eating disorders lead to physical morbidity, psychosocial impairment (Fairburn and Harrison, 2003) and the highest mortality rate of any of the psychiatric disorders (Herzog *et al.*, 2000). Characterized by a “core psychopathology” in which the importance of shape, weight and eating, and their control are over-evaluated (Fairburn, 2008), eating disorders are commonly measured for severity with reference to these attitudes and their associated features (including low body-weight, psychological distress, psychosocial impairment, binge-eating and behaviours

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which compensate for food-intake, such as self-induced vomiting and dietary restriction) (Cooper and Fairburn, 1987). Treating eating disorders can be costly, protracted (Meads *et al.*, 2001) and fraught for both sufferers and professionals (Geller *et al.*, 2012). Patients whose health is at immediate severe risk and/or have not responded to outpatient care, require intensive treatment (Olmsted *et al.*, 2007). Day treatment programmes (DTPs) provide the intensity of care, containment and other clinical benefits associated with inpatient treatment, whilst also remaining cheaper and enabling the transfer of skills from clinic to home-environment because patients return home every evening and weekend (Zipfel *et al.*, 2002).

Day treatment for eating disorders

Qualitative reviews have revealed similarities between DTPs worldwide in terms of structure and theoretical orientation between the different centres, with most operating four to five days weekly and delivering a cognitive-behavioural-based approach via group therapy (Abbate-Daga *et al.*, 2009; Lammers *et al.*, 2007). A systematic review of outcomes from 15 DTPs provided strong evidence for their effectiveness in facilitating improvements in body mass index (BMI), binge/purge and vomit symptoms, anxiety, depression, self-esteem and psychopathology among adults with eating disorders (Hepburn and Wilson, 2014). Large effect sizes were identified for changes in pre and post measures of BMI increase, symptom reduction and decrease in depression. Medium effect sizes were observed for improvement in self-esteem and reduction in anxiety and medium-large effect sizes were generally observed for attitude change, although a small effect size was identified for perfectionism (Hepburn and Wilson, 2014). Randomized controlled trials have demonstrated DTPs to be more effective than outpatient treatment (Kong, 2005) and of similar effectiveness as inpatient care (Zeeck *et al.*, 2011) at enabling patients with eating disorders to make improvements.

Although these quantitative results are positive, most DTP studies to date have focused on narrow, diagnostic outcome variables and neglected to assess outcomes in relation to the full range of DTP goals, with the exception of one Australian study which identified improvements across seven treatment goals relating to physiology, behaviour, cognitions, motivation, quality of life and perpetuating factors (Willinge *et al.*, 2010). The goals of day treatment include enabling patients to improve their wider psychosocial functioning (Olmsted *et al.*, 2009) yet this outcome has not adequately been assessed as a measure of effectiveness in relation to adult DTPs for eating disorders. A German study found that a DTP led to increased global functioning among highly motivated patients; however the sample comprised mixed-diagnosis individuals, only 12 per cent of whom had an eating disorder (Zeeck *et al.*, 2009b). An Australian study found a non-significant improvement in clinical impairment among an eating-disordered sample (Nowoweiski *et al.*, 2011), but the results of this study should be treated with caution due to methodological concerns, including small sample-size (six participants) and the inappropriate choice of a measure based on the previous 28 days for a study which only lasted 28 days.

Current study

This study aimed to investigate the effectiveness of a specialist DTP in relation to the treatment goal of reducing psychosocial impairment due to eating disorder psychopathology, as well as in relation to the nosological goals more widely used in the literature. In relation to clinical features, BMI change was used to measure weight restoration among underweight participants, behaviour change was assessed in terms of binge-eating and self-induced vomiting and attitude change were evaluated in respect of restraint (i.e. rules about eating) and concerns about eating, shape and weight, respectively. It was hypothesized that day treatment would result in reduced psychosocial impairment and fewer clinical features among patients with eating disorders.

Method

Design

This study aimed to investigate whether this DTP made a difference to participants in terms of psychosocial impairment, BMI, binge and vomit symptoms and eating disorder psychopathology. The study utilized a within-participants design, with demographic, physiological and psychological

measures taken on admission to and discharge from day treatment. All participants were exposed to the DTP intervention, although the duration of treatment varied between individuals depending on whether or not they presented as underweight on admission. Patients who were not underweight at the beginning of day treatment were enrolled on the time-limited symptom-interruption treatment pathway, which lasts for six weeks' full time attendance followed by two weeks' reduced attendance. Patients who were underweight at the beginning of day treatment followed the non-time-limited weight restoration treatment pathway, which continues full time until their BMI stabilizes above BMI 20 for two weeks and is then also followed by two weeks reduced attendance. Apart from differing lengths of stay, both groups of patients participate in the same group-only therapy programme and eat meals and snacks together.

Participants

Participants were people aged 16 or above who had sought treatment for an eating disorder and following initial assessment by the Eating Disorders Service Community Team, were referred for treatment in the DTP. For referral to this programme, patients needed to have a clinically severe eating disorder, as judged by a clinician working within the Eating Disorders Service Community Team. Specifically, patients were referred to the DTP if outpatient treatment was thought to be inappropriate, for example if community treatment had failed and/or the patient was too ill to be treated as an outpatient by the Community Team and was at risk of needing admission to a specialist in-patient setting. The DTP is also used as a "step-down" for patients who are transitioning between in-patient and out-patient care. Exclusion criteria from the DTP comprised acute suicidal ideation/behaviour, acute psychosis and uncontrolled substance dependence, but otherwise patients willing to attend the programme were accepted for treatment. If patients met the inclusion criteria for the DTP, and they gave informed consent to participate (including the release of their anonymized clinical data), then they were eligible to be included in this study.

During the period of this study (18 months), 61 patients of mixed eating disorder diagnoses were referred for treatment in the DTP, six of whom terminated treatment shortly after admission to the programme before being offered the opportunity to participate in the study and three of whom declined to participate in the study. Of the 52 remaining participants, 32 were underweight at the beginning of day treatment (defined as below BMI 20) and therefore enrolled on the weight restoration pathway and the remaining 20 who were not underweight were enrolled on the symptom interruption pathway. However, for the purposes of data analysis, the underweight group comprised only of the 27 participants with BMI < 19. In addition, for the purposes of data analysis, participants needed to have a baseline symptom frequency of four or more episodes per month to be included in the respective symptom-change analyses. These thresholds were deemed appropriate to ensure that only participants who had surpassed clinical thresholds by making considerable changes to their BMI and/or symptoms could be included in the reported remission rates for the DTP. According to these criteria, there were 18 participants with binge symptoms, 19 participants with vomit symptoms and ten participants who were both bingeing and vomiting on admission to the DTP.

In total, 12 participants terminated day treatment prematurely but remained in the study; this occurred when participants left the DTP having received fewer than four weeks' day treatment, a period that other researchers in the field have deemed the minimum adequate dose of day treatment (Olmsted *et al.*, 2013; Zeeck *et al.*, 2009a). Reasons for premature termination included being asked to leave due to non-compliance with DTP rules (e.g. failure to complete a meal, failure to restore weight consistently at the expected rate of 0.5 – 1.0 kg per week) or the patient deciding that he/she did not want, or felt unable, to stay longer.

Using G*Power (Faul *et al.*, 2007) it was calculated that a sample size of at least 23 (giving power = 0.95) would be required to attain a medium effect, with α set at 0.05.

The DTP

The DTP (established in 2011 and modelled on the Toronto DTP; Piran and Kaplan, 1990), treats people with severe eating disorders aged 16+ living within a defined geographical area in the south west of the UK. The programme is staffed by four mental health clinicians, a dietitian and a chef.

It operates five days per week (Monday to Friday), for between six and 8.5 hours daily. Weighing of patients takes place on two mornings per week. Patients are expected to eat three meals and three snacks every day; meals that are eaten during DTP hours are planned and freshly prepared by the DTP dietitian and chef, respectively, with the exception of lunch or snack once every week, which is eaten as a group in one of a range of local restaurants or cafés. Patients are supported by clinicians and the group to plan the meals and snacks they need to eat outside DTP hours.

In order to ensure that the DTP remains a “safe” and therapeutic space, patients are asked to refrain from any eating disordered behaviour (e.g. binge-eating, self-induced vomiting, laxative misuse) and other behaviours considered potentially detrimental to treatment (e.g. drinking alcohol, exercising, deliberate self-harm) while following the programme. During DTP hours, toilets are locked for one hour after meals and snacks (to prevent secretive behaviours, including vomiting) and clinicians take a zero-tolerance approach, meaning that patients will be discharged immediately from the programme if they either vomit or fail to complete any meal or snack. Paradoxically, this allows most patients to eat normally, knowing that they cannot engage in eating disorder behaviours and remain on the programme. The treatment approach is cognitive-behavioural and all therapy takes place within an open group, meaning that patients join and leave continually so that the established culture is handed on and newer patients learn from those who are more experienced. The group operates at a maximum of 12 patients at a time and is mixed diagnosis (anorexia nervosa, bulimia nervosa, binge eating disorder, Other Specified Feeding and Eating Disorder and Unspecified Feeding and Eating Disorder). On discharge from the DTP, all patients (including those who terminate day treatment prematurely) are referred back to the Eating Disorders Service Community Team for individual follow-up, but only those who complete the programme or negotiate early termination following significant progress proceed to 20-40 sessions of cognitive behavioural therapy (CBT-E; Fairburn, 2008).

Measures

Demographic data were collected, including participants' age, ethnicity, employment and marital status, duration of illness and whether or not they had received any prior treatment for an eating disorder. BMI was extracted from patient notes and measures of psychosocial impairment and eating disordered attitudes and behaviours were collected using the Clinical Impairment Assessment (CIA) questionnaire; Bohn and Fairburn, 2008) and Eating Disorder Examination Questionnaire (EDE-Q; Fairburn and Beglin, 1994), respectively.

The CIA questionnaire. This self-report measure gauges the extent of psychosocial impairment experienced due to the presence of an eating disorder during the period of the previous 28 days. Its 16 items focus on areas of life that are usually influenced by the core psychopathology typical in eating disorders: mood and self-perception, cognitive functioning, social functioning and work performance and the items combine to give a single total score (range = 0-48), with higher scores indicative of greater severity of psychosocial impairment. The CIA has been shown to have good internal reliability (Cronbach's α 0.94) and test-re-test reliability over a one-week period (Spearman's ρ 0.94) (Reas *et al.*, 2010). Normative data are available (Welch *et al.*, 2011).

The EDE-Q. This 28 item self-report, abbreviated version of the Eating Disorder Examination (EDE) investigator-based interview (Fairburn and Cooper, 1993) measures eating disordered attitudes and behaviours (including frequency of bingeing and vomiting symptoms) during the period of the previous 28 days. The EDE/EDE-Q is intended for administration immediately before the CIA. There are four subscales (dietary restraint, eating concern, shape concern and weight concern) plus a global score, which is the average of the four subscales. Scores range between 0 and 6, with higher values relating to more severe eating disorder disturbance. The EDE-Q has been shown to have good internal consistency (Cronbach's α s in the range 0.78-0.93) and test-re-test reliability over a two-week period (Pearson r coefficients in the range 0.81-0.94) (Luce and Crowther, 1999).

Procedure

Ethical approval for the study was granted by the local Research and Development Office. Measures (as specified above) are administered as a part of routine treatment; therefore patients received the same treatment experience whether or not they participated in the study. Patients who

agreed to participate in the study gave informed consent to the release of their anonymized data for the purpose of this study. Participants were recruited to the study from consecutive routine referrals to the DTP and measures were administered on admission to and on discharge from the DTP.

Results

In total, 52 participants were assessed on admission to and on discharge from the DTP. Weight restoration among underweight (BMI < 19) participants was measured in terms of BMI, binge/vomit symptoms were measured in frequency per month (for those with 4+ symptoms per month at baseline), eating disorder attitudes were measured using the EDE-Q and psychosocial impairment was measured using the CIA. Data were screened for missing items and compliance with the assumptions necessary for parametric testing. No missing data were identified. Outcomes between admission and discharge were evaluated with the appropriate inferential statistical tests (i.e. paired samples *t*-test for parametric data and Wilcoxon's *T* for non-parametric data) using SPSS Version 19.0. Bonferroni-type adjustments were made in order to minimize the risk of type I error due to multiple, nonorthogonal contrasts being performed. For each inferential statistical test reported in relation to pre/post treatment results, the *p*-value for significance (α) specified here has been reduced conditional on the number of such analyses undertaken. Effect sizes were calculated using Cohen's (1988) *d*.

Premature termination

Of the 52 participants recruited to the study, 77 per cent ($n=40$) were considered to have received an adequate dose of treatment and were included in the main analysis, having attended the DTP for at least four weeks. The remaining 12 participants (23 per cent) were considered to have terminated treatment prematurely, though they remained in the study. The average duration of treatment for the whole sample ($n=52$) was 8.7 weeks (SD = 7.3, min-max from 0.1 to 39.0). This increased to 11.0 weeks (SD = 7.3, min-max from 4.0 to 39.0) when considering only the 40 who were deemed to have received an adequate dose of treatment. The average duration of treatment for the 20 participants following the symptom interruption pathway was 6.8 weeks (SD = 3.0). This increased to 8.0 weeks (SD = 1.7) when considering only the 16 symptom interruption participants who were deemed to have received an adequate dose of treatment. The average duration of treatment for the 32 participants following the weight restoration pathway was 9.9 weeks (SD = 8.9). This increased to 12.9 weeks (SD = 8.3) when considering only the 24 weight restoration participants who were deemed to have received an adequate dose of treatment.

An overview of the demographic and clinical characteristics of the sample is provided in Table I. Comparisons were made between those who received an adequate dose of treatment and those who did not according to demographic and clinical parameters, in order to identify potential confounds for the subsequent assessment of treatment effectiveness. Mann-Whitney-*U* tests were used to compare continuous variables (i.e. age and duration of illness) and χ^2 analysis was used to compare categorical variables (i.e. marital status, occupation, gender, ethnicity, diagnosis and whether treated previously). These analyses indicated that there were no significant differences between participants who received an adequate dose of treatment and those who did not in terms of their baseline demographic characteristics and diagnosis. However, in terms of baseline measures (BMI, symptom frequency and scores for the CIA and EDE-Q), independent samples *t*-tests revealed that participants who went on to complete at least four weeks on the DTP had significantly more severe baseline scores (than those who dropped out) in relation to psychosocial impairment (as measured by the CIA; $t(50) = 3.04$, $p = 0.004$, two-tailed, $d = 0.91$), global eating disorder psychopathology (as measured by the EDE-Q; $t(50) = 2.91$, $p = 0.005$, two-tailed, $d = 0.88$) and weight concerns (EDE-Q; $t(14.2) = 2.23$, $p = 0.04$, two-tailed[1], $d = 0.80$). It was deduced that differences in the global EDE-Q score reflected differences in the weight concerns subscale. Descriptive statistics related to these significant differences are presented in Table II. All other variables (BMI for underweight patients; binge and vomit frequency; eating restraint; shape concerns) were similar at baseline for the group who received an adequate dose of the DTP and the group who did not.

Table I Demographic and clinical characteristics of the whole sample on admission

	<i>n</i> = 52
Age in years, mean (with SD)	27.1 (10.9)
Marital status (%)	
Single	70%
In relationship	13%
Married (or living as such)	13%
Divorced/separated	4%
Occupation (%)	
Employed full-time	25%
Employed part-time	13%
Student	31%
Not in employment or education	31%
Gender (%)	
Female	98%
Male	2%
Ethnicity (%)	
White British	100%
Duration of illness, mean years (SD)	10.9 (11.0)
Diagnosis by DSM-5 (American Psychiatric Association (APA), 2013) (%)	
AN-R	33%
AN-BP	13%
BN	15%
BED	6%
OSFED/UFED	33%
Previous treatment (%)	
Treated previously	77%
Not treated previously	23%

Notes: AN-R, anorexia nervosa, restricting subtype; AN-BP, anorexia nervosa, binge/purge subtype; BN, bulimia nervosa; BED, binge-eating disorder; OSFED, other specified feeding or eating disorder; UFED, unspecified feeding or eating disorder

Table II Comparison of mean baseline scores (with SDs) for those who completed 4+ weeks on the DTP and those who did not, along parameters where significant differences were identified between the two groups

<i>Measure at baseline</i>	<i>Completed 4+ weeks (n = 40)</i>	<i>Dropped out within 4 weeks (n = 12)</i>
CIA	39.2 (6.40)	32.3 (8.71)
Global EDE-Q	4.59 (1.10)	3.45 (1.48)
Weight concern (EDE-Q)	4.96 (1.23)	3.72 (1.81)

Analysis of outcomes for participants who received an adequate dose of treatment

In all, 40 participants were considered to have received an adequate dose of treatment within the DTP, having received a minimum of four weeks' day treatment. Pre- and post-treatment means (with standard deviations) for those who received an adequate dose of treatment are shown in Table III, detailed across all outcomes measured, i.e. change in BMI among underweight participants, symptom-frequency among participants displaying binge/purge behaviours, eating disordered attitudes (as measured by the EDE-Q) and psychosocial impairment (as measured by the CIA).

Effectiveness in promoting weight restoration among underweight participants. Participants who were underweight (BMI < 19) on admission to the DTP, and who completed a minimum of four weeks' day treatment (*n* = 20) had a significantly greater BMI at discharge than on admission, with a large effect size ($t(19) = -5.17, p < 0.001$, one-tailed, $d = 1.25$)[2]. Of those 20 participants who were defined as underweight at the beginning of day treatment, eight had

Table III Admission-to-discharge outcomes for participants who received an adequate dose of day treatment^a – means (with standard deviations)

	Participants	Admission	Discharge
BMI among underweight patients	(n = 20)	16.5 (1.6)	18.7 (1.9)
Monthly binge frequency	(n = 14)	15.4 (9.1)	1.3 (1.9)
Monthly vomit frequency	(n = 15)	27.8 (15.6)	7.3 (8.9)
Psychosocial impairment (CIA)	(n = 40)	39.2 (6.4)	26.6 (10.8)
Global EDE-Q score	(n = 40)	4.6 (1.1)	3.4 (1.2)
Dietary restraint	(n = 40)	3.9 (1.6)	2.1 (1.5)
Eating concern	(n = 40)	4.1 (1.2)	2.7 (1.3)
Shape concern	(n = 40)	5.3 (1.1)	4.7 (1.2)
Weight concern	(n = 40)	5.0 (1.2)	4.0 (1.5)

Notes: BMI, body mass index; EDE-Q, eating disorder examination questionnaire; CIA, clinical impairment assessment. ^aParticipants were deemed to have received an adequate dose of treatment if they completed a minimum of four weeks at the DTP

successfully restored weight into the healthy range (BMI \geq 20) at discharge, all of whom were classified as treatment completers or “graduates” from the DTP. This resulted in a full weight restoration rate of 40 per cent among those receiving an adequate dose of treatment.

Effectiveness in reducing eating disordered behaviours. Participants who presented with binge symptoms (4+ per month) on admission and who completed a minimum of four weeks’ day treatment (n = 14), were found to have significantly fewer binge symptoms at discharge, and with large effect size ($t(13) = 5.68, p < 0.001$, one-tailed, $d = 2.14$). Of those 14 participants who presented with binge symptoms pre-treatment, eight were completely abstinent from bingeing during the last four weeks of treatment, all of whom were classified as having received an adequate dose of treatment (i.e. a remission rate of 57 per cent among those with binge symptoms who received an adequate dose of treatment). Participants who presented with self-induced vomiting symptoms (4+ per month) on admission and who completed a minimum of four weeks’ day treatment (n = 15), were found to have significantly fewer vomiting symptoms at discharge, and with large effect size ($t(14) = 4.26, p < 0.001$, one-tailed, $d = 1.61$). Of those 15 participants who presented with vomiting symptoms pre-treatment, seven were completely abstinent from vomiting during the last four weeks of day treatment, all of whom were classified as having received an adequate dose of treatment (i.e. a remission rate of 47 per cent among those with vomit symptoms who received an adequate dose of treatment). Of those ten participants who presented with both binge and vomit symptoms (4+ per month for both) pre-treatment, four were abstinent from both during the last four weeks of treatment (i.e. a remission rate of 40 per cent among those with both symptoms who received an adequate dose of treatment).

Effectiveness in changing eating disordered attitudes. Between pre- and post-treatment, participants who completed a minimum of four weeks day treatment (n = 40) reported significantly fewer eating disordered attitudes (as measured by the EDE-Q), and with medium-to-large effect sizes, across the global score ($t(39) = 6.71, p < 0.001$, one-tailed, $d = 1.05$), dietary restraint ($t(39) = 6.94, p < 0.001$, one-tailed, $d = 1.14$), eating concern ($t(39) = 5.33, p < 0.001$, one-tailed, $d = 1.09$), shape concerns ($t(39) = 3.92, p < 0.001$, one-tailed, $d = 0.55$) and weight concerns ($t(39) = 4.68, p < 0.001$, one-tailed, $d = 0.71$).

Effectiveness in reducing psychosocial impairment. Participants who were considered to have received an adequate dose of treatment (n = 40) demonstrated significant improvement in psychosocial impairment (as measured by the CIA) with a large effect size ($t(39) = 8.48, p < 0.001$, one-tailed, $d = 1.43$). However, supplementary analyses revealed variation in the extent of change achieved for the different items of the CIA. The largest effect sizes were evident for improvement in participants’ ability to concentrate ($Z = -4.74, p < 0.001$, one-tailed, $d = 1.35$) and eat out with others ($Z = -5.13, p < 0.001$, one-tailed, $d = 1.09$). On admission to the DTP, among those participants who went on to receive an adequate dose (n = 40), all judged themselves impaired in

relation to their ability to concentrate, with just one participant (0.025 per cent) reporting only “a little” impairment, compared to 55 per cent ($n = 22$) reporting having the highest (i.e. most severely impaired) score. At discharge, this latter rate had dropped to 20 per cent ($n = 8$), compared to 53 per cent ($n = 21$) of the group reporting being not impaired at all, or only “a little” impaired, by poor concentration. Small-to-moderate effect sizes were evident for improvement in the extent to which participants became upset due to eating disorder psychopathology/symptomology ($Z = -3.14$, $p < 0.001$, one-tailed, $d = 0.44$) and the extent to which their work performance was affected by the illness ($Z = -2.33$, $p = 0.01$, one-tailed, $d = 0.35$).

Supplementary analyses

Analysis of the outcomes for participants on the two treatment pathways (weight restoration and symptom interruption, respectively) revealed that these results replicated the outcomes (detailed above and in Table III) for the whole group who completed at least four weeks on the DTP.

In total, 12 participants dropped out of the DTP within four weeks of admission but remained in the study. Analysis of their results between admission and discharge demonstrated no significant changes on any outcomes measured.

Intention-to-treat (ITT) analyses were undertaken, whereby repeated measures inferential statistical tests for differences were performed on admission-to-discharge data for the whole sample of 52 participants, regardless of their length of stay. These ITT analyses revealed significant improvements for the whole sample on all outcomes measured, with large effect sizes evident for BMI increase and reductions in psychosocial impairment, restraint towards eating and concern about eating, moderate effect sizes in relation to reductions in binge frequency, vomit frequency and concern about weight, and a small-to-moderate effect size for decrease in concern about shape.

Discussion

This study aimed to investigate the effectiveness of a specialist DTP in reducing psychosocial impairment, changing attitudes, restoring body-weight and decreasing behavioural symptoms among patients with eating disorders. It was hypothesized that day treatment would result in improvements between admission and discharge across all variables measured.

An analysis of outcomes from participants who were deemed to have received an adequate dose of day treatment (having stayed a minimum of four weeks at the DTP) revealed that all hypotheses were supported, in that among those participants, psychosocial impairment reduced, attitudes improved, underweight participants increased BMI and participants with binge/vomit symptoms reduced these behaviours. All changes in outcomes measured in this study were found to be statistically significant, with large effect sizes identified, excluding reduction in weight concern attitudes (moderate-to-large effect size) and reduction in shape concern attitudes (moderate effect size).

When considering the group of participants who received an adequate dose of treatment, there was variation in the extent of participants' improvement in the different aspects of psychosocial functioning measured by the CIA. Effect sizes were generally large, with the largest effect sizes evident for participants' improvement in concentration and ability to eat out. Small-to-moderate effect sizes were evident for their improvement in terms of how much the eating disorder made them feel upset and interfered with their work performance. Nevertheless, it is not surprising that smaller effect sizes were identified in the latter two areas, since the exposure-and-response-prevention approach of intensive treatment is likely to make symptoms seem more upsetting in the short term, and since day treatment required those in employment to be signed off work for the duration of the programme.

With the exception of binge frequency and dietary restraint, mean outcomes at discharge from this DTP remained within the clinical parameters specified by DSM-5 (APA, 2013) for symptoms and by Fairburn (2008) for psychopathology (i.e. community norm means plus 1 standard deviation on the EDE-Q). However, of the participants who completed an adequate dose of the DTP, 30 per cent ($n = 12$) reduced their global EDE-Q score to within the range associated with females in the general population (Fairburn, 2008) and 23 per cent reduced their CIA

(psychosocial impairment) score to within the range associated with females in the general population (Welch *et al.*, 2011). When compared to results reported by 15 DTP studies worldwide (Hepburn and Wilson, 2014) the effect sizes reported here are similar across all variables reported, i.e. large effect sizes for changes in BMI and symptoms and moderate-to-large effect sizes for changes in attitudes. Remission rates in respect of weight restoration, bingeing and vomiting are comparable with those reported elsewhere (Ben-Porath *et al.*, 2010; Fittig *et al.*, 2008; Olmsted *et al.*, 2013; Willinge *et al.*, 2010; Zeeck *et al.*, 2004, 2009a).

Premature termination of treatment is a problematic issue in the field of eating disorders, regardless of treatment modality, mainly because ambivalence is high and treatment can be complicated and tortuous (Franzen *et al.*, 2004). Nevertheless, the treatment drop-out rate for this DTP (23 per cent) was found to be consistent with rates reported by other DTPs (ranging from 0 per cent at the Freiberg Clinic to 37 per cent at Amarum in the Netherlands; Exterkate *et al.*, 2009; Zeeck *et al.*, 2009a) and lower than those typically reported by inpatient units (ranging from 20 to 53 per cent; Huas *et al.*, 2011; Kahn and Pike, 2001; Masson *et al.*, 2007; Surgenor *et al.*, 2004; Vandereycken and Pierloot, 1983; Woodside *et al.*, 2004; Zeeck *et al.*, 2005).

The results of this study underline the importance of engaging and retaining patients in day treatment. Individuals who dropped out before completing a minimum of four weeks' day treatment made no significant improvements to any of the variables assessed. Early engagement in DTPs is important because evidence suggests that patients who respond rapidly to day treatment have better outcomes and are less likely to relapse even up to two years following discharge (Bégin *et al.*, 2013; Olmsted *et al.*, 1996). In common with other DTP findings (Franzen *et al.*, 2004), results from the current study indicate that steps need to be taken in order to reduce drop-out from this DTP, possibly by introducing a preliminary mandatory motivational phase, similar to the one in operation at The Centre for Eating Disorders in Munich (Fittig *et al.*, 2008; Gerlinghoff *et al.*, 1998), in order to engage patients into day treatment and help manage expectations about what day treatment will involve (Franzen *et al.*, 2004).

This study has several strengths, including the absence of missing data, its naturalistic design (therefore high ecological validity) and the fact that (to the authors' knowledge) it is the first study to evaluate the effectiveness of a UK DTP in reducing psychosocial impairment resulting from eating disorder psychopathology. However, this study also has limitations, including small sample size, lack of control group and the fact that six individuals were not given the opportunity to participate in the study because they dropped out of the DTP within a few hours of admission, prior to being asked.

This study contributes to a growing body of evidence that day treatment is effective in reducing the physiological, behavioural and psychological symptomology of eating disorders among adults and moreover that this study provides new evidence that day treatment is effective at reducing psychosocial impairment resulting from eating disorder psychopathology. It remains for future research to determine the cost-effectiveness of DTPs, whether the improvements made during admission to day treatment can be sustained longer term, and what the broader picture is in terms of outcomes from other DTPs. Moreover, future studies could utilize control groups to investigate the pivotal question of how best to engage and retain patients in day treatment.

Notes

1. Values reported are for equal variances not assumed, since Levene's Test for Equality of Variances gave a significant result.
2. Cohen's (1988) *d*: < 0.2 = small effect; < 0.5 = medium effect; < 0.8 = large effect.

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