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Toro, C.T. [orcid.org/0000-0001-6351-1340](https://orcid.org/0000-0001-6351-1340), Payne, A. [orcid.org/0009-0003-4926-0815](https://orcid.org/0009-0003-4926-0815), Jackson, T. et al. (4 more authors) (2023) Evidence for feasibility of implementing online brief cognitive-behavioral therapy for eating disorder pathology in the workplace. International Journal of Eating Disorders. ISSN 0276-3478

<https://doi.org/10.1002/eat.23961>

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# Evidence for feasibility of implementing online brief cognitive-behavioral therapy for eating disorder pathology in the workplace

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## Funding information

Department for Health and Social Care;  
Department for Work and Pensions; Midlands Engine

Action Editor: Anja Hilbert

## Abstract

**Objective:** CBT-T is a brief (10-week) cognitive-behavioral therapy for non-underweight eating disorders. This report describes the findings from a single center, single group, feasibility trial of online CBT-T in the workplace as an alternative to health service settings.

**Method:** This trial was approved by the Biomedical and Scientific Research Ethics committee, University of Warwick, UK (reference 125/20-21) and was registered with ISRCTN (reference number: ISRCTN45943700). Recruitment was based on self-reported eating and weight concerns rather than diagnosis, potentially enabling access to treatment for employees who have not previously sought help and for those with sub-threshold eating disorder symptoms. Assessments took place at baseline, mid-treatment (week 4), post-treatment (week 10), and follow-up (1 and 3 months post-treatment). Participant experiences following treatment were assessed using quantitative and qualitative approaches.

**Results:** For the primary outcomes, pre-determined benchmarks of high feasibility and acceptability were met, based on recruiting >40 participants ( $N = 47$ ), low attrition (38%), and a high attendance rate (98%) over the course of the therapy. Participant experiences revealed low previous help-seeking for eating disorder concerns (21%). Qualitative findings indicated a wide range of positive impacts of the therapy and the workplace as the therapeutic setting. Analysis of secondary outcomes for participants with clinical and sub-threshold eating disorder symptoms showed strong effect sizes for eating pathology, anxiety and depression, and moderate effect sizes for work outcomes.

**Discussion:** These pilot findings provide a strong rationale for a fully powered randomized controlled trial to determine the effectiveness of CBT-T in the workplace.

**Public Significance:** This study demonstrates the feasibility of implementing an eating disorders intervention (online CBT-T) in the workplace as an alternative to traditional healthcare settings. Recruitment was based on self-reported eating and weight concerns rather than diagnosis, potentially enabling access to treatment for employees

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who had not previously sought help. The data also provide insights into recruitment, acceptability, effectiveness, and future viability of CBT-T in the workplace.

**KEYWORDS**

binge-eating disorder, bulimia nervosa, cognitive-behavioral therapy, eating disorder, mental disorders, workplace wellbeing

## 1 | INTRODUCTION

Eating disorders have an estimated prevalence of 0.7%, with an estimated 55.5 million cases globally in 2019 (Santomauro et al., 2021). Costs due to reduction in wellbeing are over five times total economic costs (Streatfeild et al., 2021), highlighting the extensive benefits to society of treating eating disorders effectively.

Outpatient cognitive-behavioral therapy for eating disorders (CBT-ED) has a strong evidence base for patients with conditions such as binge-eating disorder (BED) and bulimia nervosa (BN) (National Institute of Health and Care Excellence, 2017). However, CBT-ED is expensive, at up to 20 sessions of specialist care time. CBT-T, a shorter 10-session version of CBT-ED for non-underweight patients, was developed to address issues of cost, clinician time, and waiting lists (Waller et al., 2019). A recent systematic review and meta-analysis (Keegan et al., 2022) found that CBT-T's effectiveness and remission rates are comparable with longer versions of CBT-ED (e.g., Pellizzer et al., 2019; Tatham et al., 2020; Waller et al., 2018), showing it has the potential to address those capacity issues.

A growing body of research supports the effectiveness of CBT-based interventions for mental health disorders offered in the workplace setting (Tan et al., 2014). As help-seeking rates for such workers range between 13% and 46% (Dewa et al., 2011; Lim et al., 2000), making mental health services available in the workplace could enhance access for a broader set of workers. Furthermore, there might be economic benefits from boosting productivity (Dewa et al., 2011), attendance, overall mental health (Dewa et al., 2011), and perceived health support from employers (Chen et al., 2015).

Help-seeking behaviors are low for most mental health disorders. This is likely to be exacerbated by the ego-syntonic nature of some eating disorders, where help-seeking rates range from 13% to 35.6% (Ali et al., 2020). Strikingly, working-age young adults are less likely to seek treatment, and present to eating disorder services later than adolescents (Ali et al., 2020). There are further eating disorder help-seeking disparities, related to gender and socioeconomic background (Sonneville & Lipson, 2018). Making treatment for eating disorders more accessible via the workplace and less time-demanding (e.g., the brevity of CBT-T) could therefore address issues affecting patterns of help-seeking behaviors.

Delayed help-seeking can result in eating disorders lasting much longer (Austin et al., 2021). Eating disorder treatments that are provided earlier can both reduce waiting times and alleviate the need for lengthy interventions (Brown et al., 2018). Work-based access to treatment of eating disorders could have similar benefits. Availability of treatment in the workplace could also be useful for individuals with sub-threshold eating disorder symptoms, which are associated with significant comorbidities, such as

anxiety and depression (Smith et al., 2017). Furthermore, offering eating disorder services in the workplace could address the work stress that can itself contribute to the development of eating disorders (e.g., stress appraisal, which in turn predicts binge-eating behavior—Srivastava et al., 2021). For example, a study of work burnout showed that a fifth of doctors had symptoms of BED (Medisaukaite & Kamau, 2019a). Only one study to date has assessed the impact of a workplace mental health intervention on eating disorder symptoms (Medisaukaite & Kamau, 2019b).

The aim of this study is to evaluate whether the workplace is a viable setting for recruitment to and delivery of online CBT-T. Treatment was offered to self-referring employees, broadening eligibility, and including employees with sub-threshold eating disorder symptoms. Feasibility was assessed in terms of recruitment to the study (in the context of employment demands), and acceptability was assessed by attrition and attendance rates. Further insights on participant experiences of online CBT-T in the workplace were drawn from both quantitative and qualitative data. Preliminary effectiveness was tested using measures of eating pathology, anxiety and depression, and work engagement.

## 2 | METHODS

### 2.1 | Ethical approval and preregistration

This trial was approved by the Biomedical and Scientific Research Ethics committee, University of Warwick, UK (reference 125/20-21). It was registered with ISRCTN (reference number: ISRCTN45943700).

### 2.2 | Design

This study is a single-center (University of Warwick), single-group, feasibility study of online CBT-T delivery to employees in a non-healthcare context (different workplaces). We acknowledge a lack of comparison control group, randomization, and blinding as limitations in the design. Nevertheless, the data will help determine whether the workplace setting could be a suitable context for recruiting to and conducting a fully-powered RCT.

### 2.3 | Participants

A sample of 40 was sought, to allow for attrition at 47%, as found by Tatham et al. (2020). Attrition was benchmarked around those figures.

**TABLE 1** Screening questions for eligibility.

1.	Are you 18 or over?
2.	Are you currently employed?
3.	Do you try to avoid food because you are worried that eating normally would mean that you lost control of your eating and weight?
4.	Are you very worried or distressed about your body shape, weight, and size?
5.	Is your BMI 18.5 or over?
6.	Do you have a diagnosis of anorexia nervosa?
7.	Are you currently in your third trimester of pregnancy?

Note: For eligibility, answers to questions 1–5 need to be “YES” and answers to questions 6 and 7 need to be “NO.”

## 2.4 | Procedure

The study was advertised to employers across the Midlands region of England, as part of a large research program delivering several free-of-charge mental health interventions to workers in the workplace rather than healthcare setting (the Mental Health and Productivity Pilot; MHPP; mhpp.me). This region has a population of ~11 million, with 4.5 million jobs (Midlands Engine, 2021). A convenience sampling approach was used whereby 24 organizations with previous involvement in other MHPP trials were sent information about the trial. Of these, 11 employers (6 large at >250 employees and 5 small to medium at <250 employees) advertised the trial to their employees (~9000 employees in total). Business sectors include education, information and communication, manufacturing, business support, public administration, and defense. Employers advertised the service via posters and/or newsletters and/or emails to all employees. Interested employees registered their voluntary interest in the study by contacting the research team directly without needing to speak to their employer, to retain confidentiality. Participation and individual data collected from the study were not shared with participants' employers. Nor were participants under any obligation to report their involvement to their employer. Participating employers received a report following the trial that excluded individual data, in order to maintain confidentiality.

Recruitment of participants to the study took place between October 12, 2021 and February 28, 2022, and data collection and follow-up took place between December 2021 and July 2022. As recruitment commenced over 1.5 years after the first COVID-19 lockdown, it was anticipated that on-line study recruitment and delivery of therapy would not be impacted by the pandemic. The study used a two-stage consent process, with initial consent to the eligibility screening, after which eligible participants elected to enroll in the trial via informed consent. The advertising materials had a link to the study webpage giving the option to register interest. Potential participants were then sent an email link to the screening consent and eligibility questionnaire (see Table 1). Participants who were not eligible for the study were contacted and signposted to appropriate support, including information regarding UK mental health and eating disorder charities (e.g., Mind, Beat), local primary care services including family physicians, NHS Improving Access to Psychological Therapies (IAPT) services, and self-help resources.

Participants who were eligible were invited to attend a brief (20 min) online video call with a therapist to screen for suicide risk and to provide further information about online CBT-T and the trial. If no current suicidal ideation was present, the participant was invited to participate in the full trial. During the video call participants were provided with information on the informed consent and trial processes and given the opportunity to ask questions before being given access via email to the electronic informed consent form. Following informed consent, individuals were invited to attend up to 10 weekly sessions of online CBT-T (with a formal review at session 4, where therapy may be discontinued if no significant changes are made, as per the CBT-T protocol).

Sessions were delivered by a therapist on the research team via online video call and predominantly took place during office hours (9 am–5.30 pm). Some flexibility was available for early morning/evening meetings if participants did not wish to share their participation with their employer or to request time off. The therapy was delivered remotely, via Microsoft Teams, by Masters-level Psychology-qualified “Psychological Wellbeing Practitioners” with experience in delivering CBT-based low-intensity interventions in healthcare settings. The therapists were trained and clinically supervised in CBT-T by a member of the research team (GW). Their training included self-guided study, clinical skills practice between therapists, skills role plays, and addressing clinical issues via weekly clinical supervision. Progress of each participant was discussed during weekly supervision, to ensure fidelity and best practice.

Therapists used a CBT-T Therapy Tracker (developed by Dr Karina Allen & Dr Vicki Mountford—see: <https://sites.google.com/sheffield.ac.uk/cbt-t/resources/>) to record and store data from sessions with participants across the 10 weekly sessions and at the two follow-ups. The tracker was used weekly to develop individualized summaries and graphs of progress and outcomes over the course of therapy for individual participants, for discussion during clinical supervision.

Although we anticipated a low risk of such events, the occurrences of both serious adverse events and adverse events were to be recorded within specified time periods and reported to the trial management team, Principal Investigator, and ethics committee as appropriate. In addition, the trial management team would have reported the total number of events per month to the Chair of an independent Trial Monitoring Committee to expedite a safety review if more serious adverse events were seen than would be expected. However, there were no such events to report.

At 1-month follow-up, in addition to the collection of outcome measures, participants were asked to fill out a “Participant Experiences” questionnaire consisting of closed and open-ended questions designed to provide insights into the “therapy in the workplace” context. Questions explored participant opinions and experiences of the therapy and the workplace setting (e.g., advantages and disadvantages of therapy at work; for the full set of questions, see Table S4).

## 2.5 | Measures

The following measures were used in this study: Eating Disorder Diagnostic Scale (EDDS; Krabbenborg et al., 2011; Lee et al., 2007;

**TABLE 2** Data collection before, during, and after the intervention.

Data	Description (and reference where relevant)	Background questionnaires (week 0)	Therapy sessions (week no.)										Follow-up			
			1 (baseline)	2	3	4	5	6	7	8	9	10	1 month	3 month		
Demographic data	Age, gender, ethnicity, socioeconomic origin, generic information regarding employment	X												X		
Work Productivity and Activity Impairment Questionnaire: General Health V2.0 (WPAI:GH)	Six questions on work satisfaction and engagement in relation to health condition/s (Reilly et al., 1993)	X												X	X	X
Absenteeism question	Single question asking how many days sick leave taken over the past 8 weeks	X												X	X	
Eating Disorder Diagnostic Scale (EDDS)	To be used as an objective diagnostic tool (questions are based on the past 3–6 months; Stice et al., 2000)	X														
Height	To calculate BMI	X														
Weight	To calculate BMI	X	X <sup>a</sup>	X <sup>a</sup>	X <sup>a</sup>	X <sup>a</sup>	X <sup>a</sup>	X <sup>a</sup>	X <sup>a</sup>	X <sup>a</sup>	X <sup>a</sup>	X <sup>a</sup>	X <sup>a</sup>	X <sup>a</sup>	X <sup>a</sup>	X <sup>a</sup>
Eating Attitudes questionnaire (ED-15)	To track and monitor weekly changes in eating cognitions and behaviors (including binges, use of laxatives, vomiting; Tatham et al., 2015)		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Eating Disorders Examination-Questionnaire (EDE-Q)	To track and monitor more long-term changes in eating attitudes and behaviors (questions are based on the last 4 weeks; Fairburn & Beglin, 2008)		X			X							X	X		X
General Anxiety Disorder questionnaire (GAD-7)	Anxiety symptom tracking (questions are based on the past 2 weeks; Spitzer et al., 2006)		X			X							X	X		X
Patient Health Questionnaire-9 (PHQ-9)	Depression symptom tracking (questions are based on the past 2 weeks; Kroenke et al., 2001). Where question 9 only (Q9) is gathered, this is for risk screening purposes.	X (Q9) <sup>a</sup>	X			X							X	X		X

<sup>a</sup>To be gathered in session with therapist, or (for weight only) to be emailed to the therapist as soon as possible after if participant does not have access to scales (e.g., at work).

Stice et al., 2000); ED-15 (Tatham et al., 2015); EDE-Q Version 6.0 (Berg et al., 2011; Fairburn & Beglin, 2008); Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001, 2010); Generalized Anxiety Disorder-7 (GAD-7; Kroenke et al., 2007, 2010; Spitzer et al., 2006); and Work Productivity and Activity Impairment Questionnaire: General Health V2.0 (WPAI:GH; Duke & Montag, 2017; Reilly et al., 1993; Zhang et al., 2010). Background information on these measures is summarized in Table S2.

All questionnaire measures were administered online through the platform Qualtrics at timepoints specified in Table 2. They were collected within the 24 h before the therapy session they relate to, to ensure up-to-date symptoms could be discussed in sessions. The use of multiple eating disorder measures (EDDS, EDE-Q, and ED-15) was planned to highlight any differential effectiveness in identifying outcomes with both clinical and subthreshold cases, helping to determine appropriate measures for future research.

## 2.5.1 | Demographic measures

Demographic data (including age, gender, ethnicity, socioeconomic status [Cabinet Office, 2018], and height), and information regarding employment were collected as part of the questionnaires during therapy (see Table 2). Weight (kg) was measured live in each video call session using the participants' own scales. Participants who were unable to weigh themselves in-session were requested to send a photograph of their scale weight immediately after the session.

## 2.6 | Intervention

The CBT-T manual (Waller et al., 2019) was the main guide for therapists. CBT-T consists of 10 weekly sessions lasting 45–60 min, plus two follow-up sessions at 1- and 3-months post-intervention. The weekly sessions are structured around five sequential phases. A detailed summary of the intervention phases, content, and targets can be found in Table S1.

## 2.7 | Data analysis

SPSS (v.26) was used for all statistical analyses.

### 2.7.1 | Primary outcomes

For the two primary outcomes of feasibility and acceptability, measures included recruitment, attrition, and attendance data. The following benchmark was used to determine high, medium, or low feasibility:

- a. recruitment success (measured at the point of consenting to the trial)—enrolment of  $\geq 40$  participants will be considered high, 20–39 medium, and  $\leq 19$  low;

Two benchmarks were used to determine high, medium, or low acceptability:

- a. attrition—retention of  $\geq 50\%$  of patients through all assessments (weeks 1–10) will be considered high, 35%–49% medium, and  $\leq 34\%$  low. Please note that this benchmark is set to ensure that retention is comparable with routine clinical settings (where 50% is a routine level of patient retention—see Tatham et al., 2020), rather than indicating a desirable, higher level of retention;
- b. study attendance:  $\geq 80\%$  attendance at all therapy sessions will be considered high, anything below this will be considered low.

Quantitative data from response rating scales in the Participant Experiences Questionnaire (Data S1) and data from standardized measures were summarized as means and SD. Qualitative data from open-ended questions were analyzed using thematic analysis (Braun & Clarke, 2006), where the identification of themes and allocation of

material by one researcher was validated by additional researchers. Qualitative themes and subthemes with  $>45\%$  participant endorsement will be highlighted and discussed further. The  $N$  for this analysis was determined by saturation of themes (defined as no new themes over the most recent five participants).

### 2.7.2 | Secondary outcomes

Secondary outcome measures were the EDDS, ED-15, EDE-Q, PHQ-9, GAD-7, and WPAI:GH. Effect sizes were also calculated and presented with confidence intervals, enabling sample size calculations for future work.

For these analyses, there were two changes in the methodology planned in the Stage 1 report (Toro et al., 2022). First, Generalized Linear Mixed Models (GLMMs) were used (rather than the originally planned ANOVAs) for analysis of the secondary outcomes. GLMM was more appropriate because it uses all available data, adjusts for non-linear relationships between time and the dependent variables, and corrects for correlations between time-points in a repeated measures study (Bono et al., 2021). GLMM's use of all available data means that separate completer analyses were not necessary, particularly as binomial logistic regression showed no differences between completers ( $N = 29$ ) and non-completers ( $N = 14$ ) at baseline ( $\chi^2 = 9.024$ ;  $df = 7$ ;  $P = .25$ ). See Table S3 for full binomial logistic regression outcomes. The second change from the original plan (Toro et al., 2022) was that we used a clinical cut-off score of 2.77 on the EDE-Q global scale for categorical change analysis, reflecting UK norms (Waller et al., 2018), rather than 2.3 as originally planned (based on Australian norms).

## 3 | RESULTS

All planned analyses are reported here, except that GLMMs were used instead of ANOVAs (see above). Sociodemographic characteristics of the sample are in Table 3. Figure 1 shows the CONSORT diagram indicating the pattern of participant outcomes, following initial expression of interest.

### 3.1 | Primary outcomes

#### 3.1.1 | Feasibility and acceptability

Feasibility and acceptability were measured against the pre-determined benchmarks for recruitment, attrition, and attendance (see above), as reflected in Figure 1. Forty-seven participants were recruited and consented into the trial, exceeding the threshold of 40 set for high feasibility. Acceptability was assessed using attrition and attendance benchmarks. For *attrition*, the high acceptability target of retaining  $\geq 50\%$  of participants was met, as 61.7%

Characteristics	Mean	(SD)	% of sample
Age	39.74	(10.88)	—
Gender (female/male)	—	—	91.5/8.5
Body mass index (BMI)	31.65	(8.09)	—
Ethnicity (white/non-white)	—	—	83/17
Workplace (HEI/non-HEI)	—	—	80.9/19.1
Hours worked per week	34.83	(6.50)	—
Hours worked type (full-time/part-time)	—	—	80.9/19.1
Work base (home/office/hybrid)	—	—	14.9/10.6/74.5
Household income (low/medium/high)	—	—	29.8/51/19.2
Marital status (S/C/O)	—	—	21.3/70.2/8.5
N people in household	2.57	(1.06)	—
Household makeup (A/FM/PF)	—	—	10.6/8.5/80.9
Highest qualification (A-levels/UG/PG)	—	—	19.2/40.4/40.4
Eating Disorder Diagnostic Scale (EDDS) diagnosis (BED/BN/aAN/UFED/ND)	—	—	29.8/34/4.3/6.4/25.5

Note: Hours worked type: full-time =  $\leq 35$  h, part-time  $< 35$  h. Household income: low  $< \pounds 30,000$ , medium =  $\pounds 30,000$ – $\pounds 90,000$ , and high  $> \pounds 90,000$ . Marital status: S, single; C, cohabiting (including married); O, other (divorced, widowed). Household makeup: A, alone, FM, with flatmates, P, with partner or family. Highest qualification: UG, undergraduate qualification, PG, post-graduate qualification. EDDS diagnosis: BED, binge eating disorder; BN, bulimia nervosa; aAN, atypical anorexia nervosa; UFED, unspecified feeding or eating disorder; ND, no diagnosis. Abbreviation: HEI, Higher Education Institute.

( $n = 29$ ) completed treatment. Of those who completed treatment, 79.3% ( $n = 23$ ) attended the two follow-up appointments. The other acceptability benchmark ( $\geq 80\%$  attendance of pre-booked appointments with their therapist) was exceeded with 98.2% attendance, also confirming high acceptability. Thus, recruitment to and delivery of CBT-T via the workplace appears to be highly feasible and acceptable.

### 3.1.2 | Patient experience of the therapy in the work setting

#### Rating scales

To enhance understanding of the acceptability of the intervention and contextual factors with regards to having the therapy available at the workplace, participants were asked to complete an online “Participant Experiences” questionnaire at one-month follow-up. Analysis of the quantitative data (see Table S3) showed that participants ( $N = 24$ ) gave high ratings to *acceptability*, *helpfulness in reducing eating disorder behaviors*, and *tailoring of each phase of the therapy to personal needs*. Mean ratings (0–10) ranged across items from 8.50 ( $SD = 1.89$ ) to 9.63 ( $SD = 0.65$ ) suggesting high acceptability.

Of the 24 participants who completed the Participant Experiences questionnaire at 1-month follow-up, five (20.8%) had previously sought help for eating concerns from either family doctors or private counselors, but only one had been offered treatment. The majority (70.8%) said they would be more likely to attend appointments in the workplace over a clinical setting, while 16.7% indicated no preference.

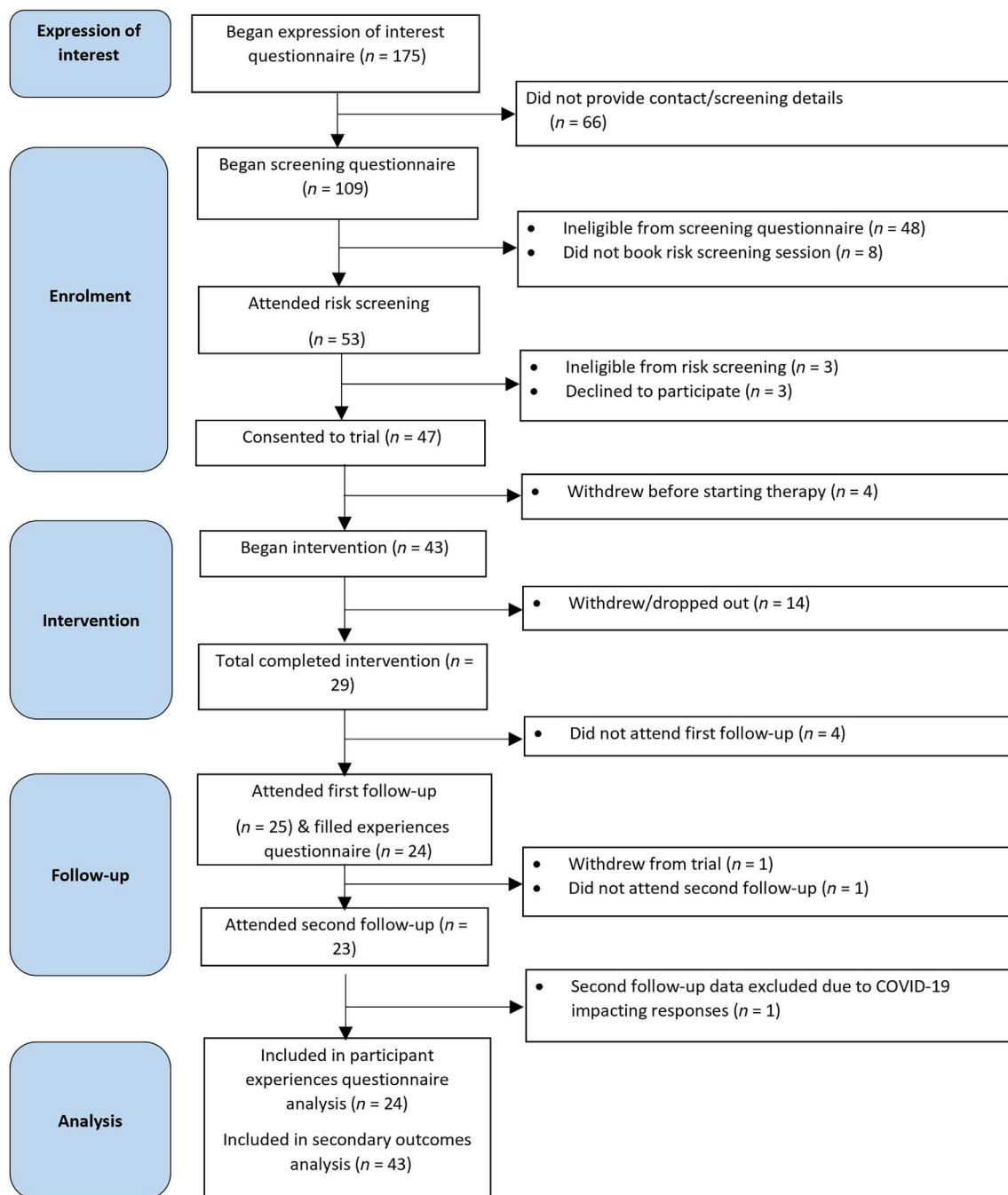
**TABLE 3** Sociodemographic characteristics of participants who consented to the study ( $N = 47$ ), collected at baseline.

Advantages of having therapy in the workplace, as opposed to a clinical setting, were reported by 83.3%, while disadvantages were reported by 29.2%. Participants reported improvements in work engagement both during and after receiving therapy (mean = 5.88 [ $SD = 3.07$ ] and 5.92 [ $SD = 3.32$ ] out of 10, respectively).

#### Qualitative analysis

Qualitative analysis was used to understand the participants' experience of this intervention. Responses were analyzed using Braun and Clarke's (Braun & Clarke, 2006) six-stage process of Thematic Analysis. Responses were anonymized and question headers removed, and they were coded by a member of the research team (TJ; rater 1). Codes were collated into main themes and subthemes. Main themes were required to have five or more codes to classify as a theme (rather than reflecting idiosyncratic responses), and subthemes were required to include at least two comments from different individuals. A sample of codes (10%) were checked to establish inter-rater reliability (81%) between two researchers (TJ and AP—rater 2), leading to refinement of themes/subthemes. Subsequently 10% of the codes and the revised themes were passed on to rater 3 (an independent researcher), yielding 86% inter-rater reliability between raters 1 and 3. Final codes were agreed following the discussion of any differences, moderated by another of the team (GW).

Seven themes emerged, based on the 24 participants who provided responses on their experience of this therapy (see Figure 2). Example items are given in Table 4. The first theme was “Work or the workplace as a trigger.” This consisted of four subthemes—*work-related stress* (11/24 participants; 45.8%); *food availability at work* (4/24 participants;



**FIGURE 1** CONSORT diagram showing recruitment, retention, and attrition of participants.

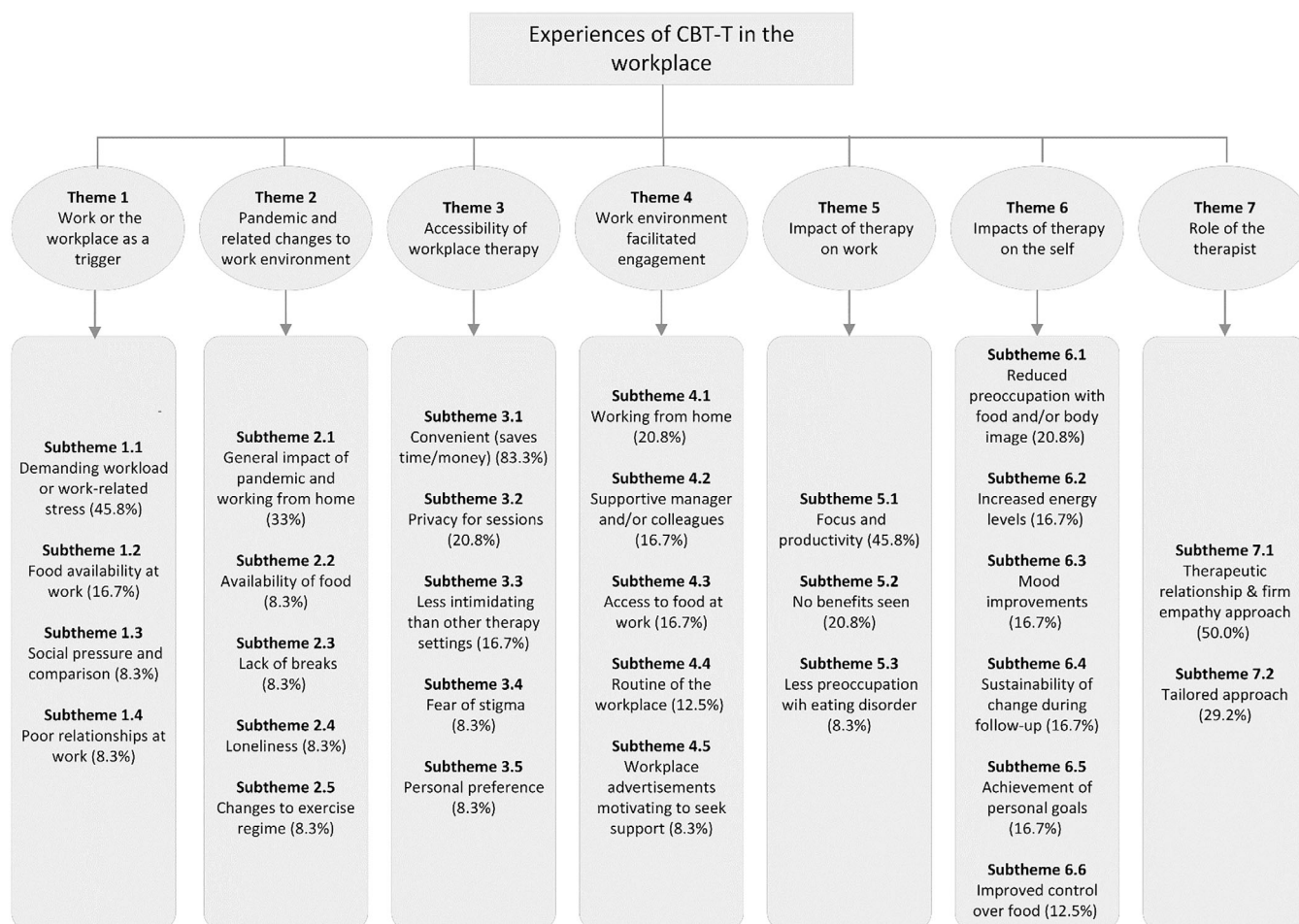
16.7%); *social pressure and comparison* (2/24 participants; 8.3%); and *poor relationships at work* (2/24 participants; 8.3%). Thus, work-related stress was the predominant participant experience in this theme.

The second theme was specific to the time at which the study was held—“Pandemic and related changes to work environment.” There were five subthemes—*general impact of pandemic and working from home* (8/24 participants; 33%); *availability of food* (2/24 participants; 8.3%); *lack of breaks* (2/24 participants; 8.3%); *loneliness* (2/24 participants; 8.3%); and *changes to exercise regime* (2/24 participants;

8.3%). Thus, the general impact of the pandemic and having to work from home was the strongest experience in this theme.

The third theme—“Accessibility of workplace therapy”—reflected positive and negative impacts of accessibility. The five subthemes were: *convenient* (20/24 participants; 83.3%); *privacy for sessions* (5/24 participants; 20.8%); *less intimidating than other therapy settings* (4/24 participants; 16.7%); *fear of stigma* (2/24 participants; 8.3%); and *personal preference* (2/24 participants; 8.3%). Thus, convenience, privacy and low intimidation were seen as key to accessibility.





**FIGURE 2** Thematic map of main themes and subthemes emerging from participant experiences questionnaire.

Theme 4 related to how the “Work environment facilitated engagement in therapy.” The five themes were: *working from home* (5/24 participants; 20.8%); *supportive manager and/or colleagues* (4/24 participants; 16.7%); *access to food at work* (4/24 participants; 16.7%); *routine of the workplace* (3/24 participants; 12.5%); and *workplace advertisements motivating to seek support* (2/24 participants; 8.3%). This pattern demonstrates that a range of work-related issues were seen as supporting engagement in this therapy.

The fifth theme was the experience of “Impact of therapy on work,” with three subthemes. The first of these was *focus and productivity* (11/24 participants; 45.8%); *no benefit of therapy* (5/24 participants; 20.8%), indicating that work had not previously been impacted by their eating disorder; and *less preoccupation with eating disorder* (2/24 participants; 8.3%). Overall, the therapy yielded positive outcomes in terms of work, with no negative impacts.

Theme 6 related to “Impacts of the therapy on the self,” with six sub-themes. The strongest of these was *reduced preoccupation with food and/or body image* (5/24 participants; 20.8%); followed by *increased energy levels*, *mood improvements*, *sustainability of change at follow-up*, and *achievement of personal goals* (4/24 participants each; 16.7%), and *improved control over food* (3/24 participants; 12.8%). Overall, the therapy yielded positive outcomes in

terms of all of these domains, apart from concerns about achievement of personal goals, where further work was suggested by some participants.

The seventh theme was about the “role of the therapist.” Two strong subthemes emerged—*therapeutic relationship and firm empathy approach* (12/24 participants; 50.0%) and *tailored approach* (7/24 participants; 29.2%). Overall, the firmness and the individual responsiveness of the therapists were regarded very positively.

### 3.2 | Secondary outcomes

GLMM analysis was conducted on the outcome variables (eating attitudes, depression, anxiety, work impairment, absenteeism). The best fit to the data was a non-linear logarithmic function of time, shown by logN time having the lowest  $-2 \log$  likelihood score for all outcome variables (see Table S5 for different time distributions used).

Main effect terms are used to demonstrate change over time for each variable (Table 5; Figure 3). Negative beta values show a reduction in scores over the course of the intervention. Significant changes over time were found for EDE-Q global scores, ED-15 global scores,

**TABLE 4** Sample statements by participants, contributing to the themes and sub-themes identified in qualitative analysis.

Theme	Subtheme	Example statements (participant number)	
Workplace as a trigger	Work-related stress	[4] “Time pressure means not always got time to eat in a structured way leading to snacking/going without food.” [10] “Busy schedule can disrupt my eating habits, what could result in me getting too hungry and then overeating.”	
	Social pressure and comparison	[2] “... social pressure can make other behaviors worse.” [18] “I spend quite a lot of my time working with large groups of young people which can be challenging with regards to my body image (i.e., I can feel ‘exposed’ and that people are judging me)”	
	Poor relationships at work	[19] “The attitude of the managers not being supportive <worsens eating disorder behaviors>.” [24] “I am a bit concerned about bullying and harassment which has grown in magnitude however, I am trying to be strong and not use food as a crux for dealing with these issues, but I cannot ignore the fact that issues could arise as there is a significant risk.”	
	Food availability at work	[2] “The push to be in the office and eat around people/eat certain things brought in (or constantly turn down offers of foods, sometimes this will not be listened to and you are asked for a reason you do not want it) can make some coping behaviors worse. Also <there is> general stress from preparing suitable foods to take into the workplace and foods that are ‘easier’ to eat.” [18] “There are often lots of snacks, cakes, etc. in the office which can be ‘tempting’ but also lots of people talk about needing to lose weight for holidays, special occasions, etc.”	
Pandemic and related changes to work environment	General impact of pandemic and working from home	[22] “Working from home meant at first I could use behaviors more frequently, often without realizing it.” [12] “My bingeing got a lot worse when the pandemic started. I was at home alone and I would regularly order take aways and binge. Sometimes even at lunchtime.” [19] “<Pandemic> made everything more disorganized and chaotic. Made it easier to worry about all things and to find refuge in food. Added a lot of worry and concerns for the future and health and made it easier to neglect mental health. Also, working from home did not help with eating patterns or with the stress and having no boundaries between the working day and relaxing afterwards.”	
	Availability of food	[4] “Working from home made food more available and so overeating was easier.” [24] “Being at home meant unlimited access to food and I could have whatever I want whenever I want, but the therapy has helped me to keep that under control.”	
	Lack of breaks	[3] “<During lockdown I was working from home> and not really taking any breaks. I would work 8 am until 6 pm or later often without breaks.” [5] “Working longer hours with less breaks means meals get missed and working at home with easy access to the kitchen means I sometimes end up snacking at inappropriate times ruining my appetite during meals.”	
	Loneliness	[2] “Being at home for a full lunch hour generated some behaviors to get worse, as did being alone for the majority of working hours.” [17] “I think working from home made my eating disorder worse as I was home alone for a lot of time which made it easier to binge eat.”	
	Changes to exercise routine	[6] “More time to exercise excessively.” [14] “Weight gain due to gym closure triggered it.”	
	Accessibility	Convenient (saves time/money)	[7] “Fitting the sessions in around work meant not having to take time off work, time which I would not otherwise have been able to give.” [23] “I would not have gone looking for therapy. The fact it came into my email box made me stop and think. I work long hours and trying to find time to go and see someone in person would never have happened. I have benefitted from this process immensely because I could access it in work time.”
Privacy for sessions		[5] “It was sometimes hard to find a suitable place to have the session during working hours where I could speak freely.” [19] “<The office> made it less ‘formal’ and harder to find a quiet space. More difficult to decompress after the session as there was no actual space for this.”	
Less intimidating than other therapy settings		[14] “Not having to go through GP was less scary.” [15] “... it being delivered via my workplace took the sterile and medical nature away from this, making me feel more at ease than I believe I would do in a medical setting.”	
Fear of stigma		[9] “Felt more exposed doing it in work time.” [16] “Initially difficult and embarrassing to explain to my manager why I wanted the time off.”	
Personal preference		[9] “Would have felt more comfortable having the meetings at home.” [19] “<The workplace> made it less ‘formal’.”	
Work environment facilitated		Working from home	[13] “Working from home provides more flexibility for mealtimes and also provides easier access to prepare food without the need to rely on what can be taken in a box.”

(Continues)

TABLE 4 (Continued)

Theme	Subtheme	Example statements (participant number)
engagement in therapy		[18] "... being at home more of the time means that I can have a snack when I need/want one, where I might not have availability of snacks at work and might then binge from hunger."
	Supportive manager and/or colleagues	[2] "... being able to talk to my direct lead about spending time looking after my mental health now that the hour-long sessions have finished. I can still take some of that time to look after myself." [21] "Nearly all of my colleagues are a great supportive team and my boss is fully supportive and believes in me, so that really helps my stress levels."
	Access to food at work	[3] "There are cafes and vending machines in close proximity so food is available if I forget to bring it with me."
	Routine of the workplace	[4] "<Work provides> a better structure for times to eat." [21] "Working in the office more often now gives me more structure to my meals and snacks, whereas when working from home 100%, the fridge was always there."
	Workplace advertisements motivated me to seek support	[3] "I did not think I had disordered eating patterns until I read the information about the trial in a work circular. I would not have thought to go to a clinic to sign up for therapy as I did not think I needed it until I saw the email." [23] "I would not have gone looking for therapy. The fact it came into my email box made me stop and think. I work long hours and trying to find time to go and see someone in person would never have happened."
Impacts of therapy on work	Focus and productivity	[17] "The program has reduced my constant thoughts about food which has made it easier to concentrate on my work." [21] "By continuing the habits and principles learned in the program (e.g., regular meals and snacks, taking breaks), I am definitely a lot more productive and focused with work."
	No benefits seen	[4] "Other than filling the questionnaire and meetings there was no impact <on my work.>" [18] "I never had engagement issues <at work>."
	Less preoccupation with eating disorder	[6] "<Therapy> helped me stop focusing so much on disorder behaviors, giving more head-space for work."
Impacts of therapy on the self	Reduced preoccupation with food and/or body image	[4] "I was less distracted by my own issues and thoughts of eating." [18] "I had better coping mechanisms for when thoughts about my body image came into my head which meant they did not 'derail' me for long."
	Increased energy levels	[10] "I started to worry less about my eating habits, my energy levels have improved, and I am striving to be more kind to myself in various aspects." [17] "Because I am regularly eating it has given me more energy in the afternoons."
	Mood improvements	[11] "I felt more focused and less emotional." [21] "By eating more moderately and regularly ... my moods were more stable. I can think more clearly now and can concentrate a lot better with a lot less anxiety."
	Sustainability of change during follow-up	[15] "Once I noticed that the things I was meant to be doing had lapsed (sooner that I would have noticed without this program) I have been able to put some things back in place and identify ways to meet other issues/challenges as well." [12] "I have changed my eating patterns, making sure I eat regularly. I am still overeating though so need to keep working on this."
	Achievement of personal goals	[7] "It <therapy> did not address my weight loss goals which is the reason why I ended up with an unhealthy relationship with food to start with. It is an ongoing battle." [22] "I think I would have benefited from more time spent in body image. A big focus was on food intake which was important, but I feel my biggest concerns were more about body image and shape—and while I now know what effect cutting carbs and not my eating regularly has, I have not made steps toward losing weight and improving body shape, which is still important for my health."
	Improved control over food	[21] "High stressful situations can be a trigger for me to restrict my eating but I am in the habit of having even just a small snack so I do not go too long without food and then avoid a binge later." [24] "Being at home meant unlimited access to food and I could have whatever I want whenever I want, but the therapy has helped me to keep that under control."
	Role of therapist	Therapeutic relationship and firm empathy approach
Tailored approach		[11] "It <therapy> felt entirely focused on my needs." [17] "The goals and homework that was sent for me every week felt very tailored to me. For example, to eat foods that I liked and to go and buy clothes that fitted me as I usually wore clothes that were too big."

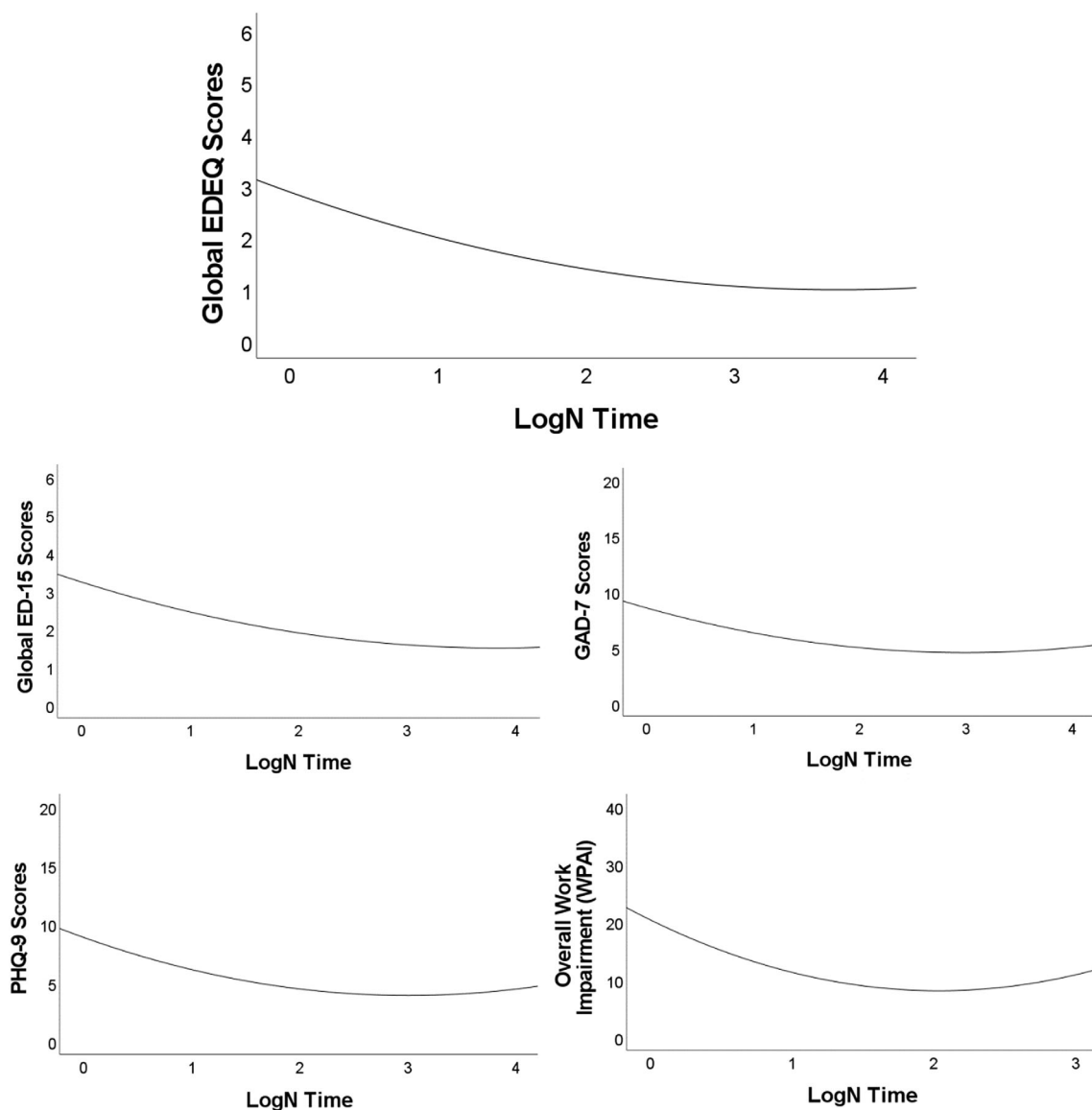
Note: The full set of anonymized quotes are available upon request to the corresponding author.

**TABLE 5** Eating pathology, depression, anxiety, work impairment, and sick days over the course of treatment with results of Generalized Linear Mixed Models analysis and effect sizes (Cohen's *d*) from beginning to end of treatment and end of treatment to 3-month follow-up.

	Baseline (session 1), N = 43		Mid-treatment (session 4), N = 37		End of treatment (session 10), N = 29		Follow-up 1 (1-month post-treatment), N = 25		Follow-up 2 (3-months post-treatment), N = 22		Generalized linear mixed model		Cohen's <i>d</i> (baseline-end of trx) [95% CI]	Cohen's <i>d</i> (end of trx-follow-up 2) [95% CI]	
	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	B [95% CI]	F(df)			P
EDE-Q global	2.83	(0.92)	2.14	(0.81)	1.19	(0.67)	1.13	(0.73)	1.00	(0.62)	−1.24 [−1.43, −1.03]	131.94 (1154)	<.001	1.79 [1.19, 2.37]	0.40 [−0.04, 0.84]
ED-15 global	3.14	(1.01)	2.73	(1.19)	1.63	(1.21)	1.57	(0.97)	1.57	(1.00)	−1.12 [−1.42, −0.83]	56.13 (1154)	<.001	1.02 [0.57, 1.47]	0.16 [−0.26, 0.58]
Objective binges	2.81	(2.30)	0.35	(0.92)	0.04	(0.19)	0.04	(0.11)	0.07	(0.16)	−1.84 [−2.22, −1.47]	93.93 (1153)	<.001	1.22 [0.73, 1.70]	−0.10 [−0.52, 0.32]
PHQ-9	8.88	(4.82)	6.22	(4.87)	3.93	(3.96)	4.60	(4.06)	4.18	(3.75)	−3.19 [−4.39, −2.00]	27.84 (1154)	<.001	1.19 [0.70, 1.66]	0.00 [−0.42, 0.42]
GAD-7	8.53	(5.56)	6.49	(5.00)	4.72	(4.11)	4.80	(4.83)	4.95	(4.37)	−2.56 [−3.88, −1.24]	14.74 (1154)	<.001	0.87 [0.43, 1.29]	−0.07 [−0.49, 0.35]
WPAI (work time missed)	1.60	(4.08)	—	—	2.04	(9.31)	3.83	(14.82)	1.73	(8.12)	0.78 [−2.29, 3.84]	0.25 (1118)	0.62	−0.08 [−0.44, 0.29]	0.07 [−0.35, 0.49]
WPAI (impairment while working)	19.53	(21.15)	—	—	8.28	(12.27)	9.60	(16.70)	10.00	(15.12)	−7.83 [−13.63, −2.02]	7.14 (1118)	0.009	0.60 [0.20, 0.99]	−0.10 [−0.52, 0.32]
WPAI (overall work impairment)	20.72	(21.56)	—	—	9.77	(15.71)	9.83	(17.77)	10.19	(15.78)	−8.57 [−14.74, −2.41]	7.59 (1118)	.007	0.53 [0.13, 0.91]	0.02 [−0.40, 0.44]
WPAI (activity impairment)	30.23	(26.32)	—	—	13.10	(21.56)	11.60	(20.55)	11.82	(13.68)	−14.80 [−22.19, −7.40]	15.70 (1118)	<.001	0.64 [0.23, 1.03]	0.04 [−0.38, 0.46]
Absenteeism (n sick days—8 weeks)	1.20	(2.59)	—	—	0.76	(1.96)	1.04	(3.99)	1.05	(2.17)	−0.12 [−1.01, 0.77]	0.07 (1119)	0.79	0.08 [−0.29, 0.44]	−0.05 [−0.47, 0.37]

Note: Cohen's *d* values calculated for paired samples.

Abbreviations: EDE-Q, Eating Disorders Examination Questionnaire; ED-15, Eating Disorders 15; GAD-7, Generalized Anxiety Disorders-7; PHQ-9, Patient Health Questionnaire-9; WPAI, Work Productivity and Impairment.



**FIGURE 3** GLMM outcome: Plots for logN Time with EDE-Q global scores, ED-15 global scores, GAD-7, PHQ-9, and WPAI Overall Work Impairment. Time 0 = baseline, 1 = week 4 session, 2 = week 10 session, 3 = 1-month follow-up, 4 = 3-month follow-up (for all measures except Overall Work Impairment [WPAI], where 1 = week 10 session [not week 4]). EDE-Q, Eating Disorders Examination Questionnaire; ED-15, Eating Disorders 15; GAD-7, Generalized Anxiety Disorders-7; PHQ-9, Patient Health Questionnaire-9; WPAI, Work Productivity and Impairment.

objective binge eating, PHQ-9 scores, GAD-7 scores, WPAI impairment while working, WPAI overall work impairment, and WPAI activity impairment. There were no differences on Absenteeism or WPAI work time missed. There were large to very large effect sizes across therapy on the pathology measures, and moderate effect sizes on the work-related measures. There was no evidence of substantial deterioration over the follow-up period. On the contrary, there was some further improvement in eating attitudes.

Participants were considered to have reached the criteria for full remission when they met all of the following three criteria: Cognitive Improvement (EDE-Q global score reduced by at least one point); EDE-Q global score below the clinical cut-off of 2.77 (Waller

et al., 2018), and Behavioral Remission (a full cessation of objective binge-eating). At baseline, 14 treatment completers were classed as the “clinical” group as they had a global EDE-Q score at or above the clinical cut-off (2.77). Of these, all 14 met the full remission criteria (EDE-Q, cognitive and behavioral remission) at the end of treatment (session 10), and eight of the 11 (72.7%) who attended the 3-month follow-up continued to meet full remission criteria. Of the treatment completers recording below the global EDE-Q clinical cut-off at baseline (i.e., “sub-threshold”;  $N = 15$ ), eight (53.3%) reached cognitive and behavioral remission, thus meeting full remission criteria at the end of treatment. Of those who attended the 3-month follow-up from that group, 50% ( $N = 6/12$ ) still met full remission.

## 4 | DISCUSSION

This study examined the viability of offering online CBT-T in the workplace for non-underweight people with eating disorders and for those with sub-threshold eating problems. Pre-determined recruitment, attrition, and attendance targets were met, demonstrating high feasibility and acceptability. Preliminary effectiveness was promising, with strong effect sizes for eating pathology, anxiety, and depression. These findings align with effect size ranges for EDE-Q, depression, and anxiety reported in a meta-analysis of previous CBT-T studies (Keegan et al., 2022), even though the present sample were considerably older than those in that meta-analysis (mean age = 39.74 vs. 29.24 years). Moderate effect sizes were found for work outcomes after therapy and follow-up. The therapy led to a reduction in %overall work impairment due to poor health, indicating improved productivity. Overall, findings from the quantitative data support the extension of this work to controlled, larger-scale workplace-based studies of CBT-T.

Considering qualitative themes and subthemes with >45% participant endorsement, findings indicated that the workplace is an acceptable therapeutic setting, enhancing outcomes through increased accessibility of therapy and improved help-seeking. The nature of work and the workplace (e.g., demanding workload; work-related stress) triggered eating disorder behaviors for some participants. However, the workplace also had positives, facilitating engagement in therapy. The therapy itself was reported to improve focus and productivity at work, as well as leading to positive clinical outcomes. The role of the therapist was important in keeping participants on track, enhanced by the use of a firm empathic approach.

This study adds to the evidence for workplace mental health interventions (e.g., Tan et al., 2014). Low help-seeking in working-age eating-disordered individuals (Ali et al., 2020) means that increasing accessibility might facilitate earlier intervention and remission (Austin et al., 2021), reducing pressures on mental health services. Qualitative themes supported the suggestion that the workplace would be seen as more accessible and convenient than traditional clinical settings (e.g., travel costs; flexible timings). This superior accessibility could address the help-seeking gap, as some individuals reported that they would not have sought therapy had it not been presented directly through the workplace.

The setting and nature of work can exacerbate poor mental health (Harvey et al., 2017). Here, the perceived nature of the work environment influenced how individuals interacted with the treatment process. Participants reported work-specific triggers to their eating problems (Medisaukaite & Kamau, 2019a; Medisaukaite & Kamau, 2019b). However, when work relationships were perceived to be supportive and the work environment conducive to the demands of therapy, engagement in therapy was facilitated. This work-based approach to eating disorder treatment could increase perceived health support at work, thus improving productivity (Chen et al., 2015). Given the positive work- and health-based outcomes of this intervention, employers and workers alike appear to benefit from therapy via the workplace. However, potential stigma-based barriers to therapy in the workplace should

be considered in future research, even though they were relatively uncommon.

Strengths of this feasibility study include the use of both quantitative and qualitative approaches. Inclusion of work-related secondary outcomes (absenteeism and presenteeism) using the WPAI:GH (Reilly et al., 1993), along with findings of a positive impact of the therapy on productivity, provides data that are relevant to business leaders. Future studies should assess the costs and benefits for businesses, to provide further data to support the case for investment in such access to therapy. It will also be important to consider the fact that the retention rate of such interventions is objectively limited (ca. 50%). Even though this retention rate is similar to that in clinical settings, it should be factored into considering the cost/benefit analysis of making such an intervention available via workplaces.

A key limitation is demographic and socioeconomic generalizability, given the largely Caucasian, female, and well-educated nature of the sample. Future research needs to demonstrate that this approach works across sociodemographic and economic settings. Additionally, participants had computer access to online therapy, but such access is less likely to be available in some work settings. Accessibility might also have been facilitated by the home-working conditions for many people under COVID-19 restrictions. Finally, future research would benefit from a more robust diagnostic method, such as the Eating Disorder Examination (EDE; Fairburn et al., 2008), to determine how many participants were sub-threshold rather than meeting full diagnostic criteria. Use of an interview-based diagnosis and assessment would also allow researchers and clinicians to understand whether the effectiveness estimates of this study are replicable when using more rigorous assessment methods.

## 5 | CONCLUSIONS

CBT-T accessed via the workplace is feasible, acceptable, and potentially very effective. This approach could lead to earlier provision of interventions and lower pressure on mental health services. Future research should extend this approach to other therapies and other disorders. However, the findings provide a strong rationale for a fully-powered RCT to determine the effectiveness of CBT-T in the workplace and other non-traditional settings (e.g., schools).

### AUTHOR CONTRIBUTIONS

**Carla Tatiana Toro:** Formal analysis; investigation; methodology; supervision; visualization; writing – original draft; writing – review and editing. **Agatha Sarah Payne:** Data curation; formal analysis; investigation; methodology; project administration; visualization; writing – original draft; writing – review and editing. **Tabitha Jackson:** Data curation; formal analysis; investigation; methodology; project administration; visualization; writing – original draft; writing – review and editing. **Sean Russell:** Funding acquisition; writing – review and editing. **Guy Daly:** Funding acquisition; writing – review and editing. **Glenn Waller:** Conceptualization; formal analysis; methodology; resources; supervision; validation; visualization; writing – review and editing. **Caroline Meyer:**

Conceptualization; funding acquisition; resources; writing – review and editing.

## FUNDING INFORMATION

As part of the MHPP program (mhpp.me), this research was funded by Department for Work and Pensions, Department for Health and Social Care, and Midlands Engine. The funders had no role in the design, analyses, interpretation of the data, or decision to submit the results of this study for publication.

## CONFLICT OF INTEREST STATEMENT

The authors have no conflict to declare.

## OPEN RESEARCH BADGES



This article has earned an Open Data badge for making publicly available the digitally-shareable data necessary to reproduce the reported results.

## DATA AVAILABILITY STATEMENT

Data are available from the corresponding author upon reasonable request.

## ETHICS STATEMENT

This study was approved by the Biomedical and Scientific Research Ethics committee, University of Warwick, UK (reference 125/20-21).

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

**How to cite this article:** Toro, C. T., Payne, A., Jackson, T., Russell, S., Daly, G., Waller, G., & Meyer, C. (2023). Evidence for feasibility of implementing online brief cognitive-behavioral therapy for eating disorder pathology in the workplace. *International Journal of Eating Disorders*, 1–15. <https://doi.org/10.1002/eat.23961>