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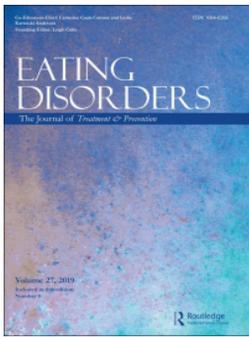
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# Eating Disorders

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## Enhancing assessment for eating disorders: the impact of a podcast-based pre-treatment psychoeducation intervention

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### ABSTRACT

This study reports the outcome of a low intensity pre-treatment intervention (a guided e-health podcast) for patients with anorexia nervosa and bulimia nervosa, delivered between assessment and the start of the full outpatient treatment programme. A case series design was used. A total of 254 patients at a specialist eating disorder service were offered a pre-treatment three-week psychoeducational intervention (Keeping Myself Safe; KMS), and 203 undertook the intervention. The intervention consisted of six podcasts (107 mins), an accompanying workbook, and a follow-up review appointment. Body Mass Index and Eating Disorder Examination-Questionnaire scores were taken at assessment, end of the KMS intervention (mean duration = 21.9 days) and start of treatment (mean = 79.8 days post KMS intervention). Generalised Linear Mixed Models were used to test main and interaction effects (diagnosis x time). There were improvements on most variables following the KMS intervention. The effects were more pronounced for patients with bulimia nervosa across several measures. Pre-treatment guided e-health psychoeducational interventions can be associated with early attitudinal and behavioural change in patients with bulimia nervosa and anorexia nervosa whilst on the waiting list for treatment. They allow greater, affordable accessibility to effective psychoeducation and enhance potential engagement. More research is required to investigate the longer-term impact on retention and outcome, particularly in anorexia nervosa.

### Clinical Implications

- Pre-treatment psychoeducation ('Keeping Myself Safe') is an effective intervention
- Podcasts are a useful medium for developing early change
- The effects of such psychoeducation are strongest for bulimia nervosa

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- Podcast interventions are low intensity, disseminable and affordable, and can provide timely access to helpful psychoeducational advice promoting early behavioural change

It is important to ensure rapid access to effective interventions for patients with eating disorders (e.g., Brown et al., 2016), particularly given the growth in referrals and waiting lists in recent years (e.g., Ayton et al., 2022; Hansen et al., 2021). Simply spending time on a waiting list is not associated with significant positive change: rather, it is associated with poorer outcomes, including greater attrition (e.g., Carter et al., 2012; Waller et al., 2009). Several initiatives have been developed to meet this challenge, including active procedures to manage waiting lists (e.g., Carmen et al., 2007; Tatham et al., 2012). Pre-treatment psychoeducational interventions can also enhance engagement and potential outcomes whilst patients wait for treatment (e.g., Tatham et al., 2016). However, the importance of disseminating such information in a timely way whilst waiting for treatment has never been greater (Davey et al., 2023).

While psychoeducation is a core component of several evidence-based treatments for eating disorders (National Institute for Health and Care Excellence, 2017), there has been comparatively little research on the effect of a pure psychoeducational intervention on symptoms. Most such research has focused on the impact of psychoeducation for non-underweight patients and shows that it can reduce unhealthy eating attitudes and behaviours (e.g., Tatham et al., 2016). These studies included controlled comparisons with other conditions, as well as cohort comparisons and case series (e.g., Davis et al., 1997; Olmsted et al., 1991), and yielded similar findings. However, such interventions tend to require several patient contacts and high staff involvement (e.g., group interventions), thus potentially reducing staff availability for the necessary subsequent interventions.

In response to these limitations, Fursland et al. (2018) demonstrated the impact of a pre-treatment single-session psychoeducational intervention, with a mixed group of 448 patients with anorexia or bulimia nervosa. This intervention led to reduced waiting times for treatment and a reduction in eating disorder symptoms, including an increase in weight/body mass index (BMI) among patients with anorexia nervosa. To date, this is the only study to report a positive impact of a standalone psychoeducational intervention for patients with anorexia nervosa. In addition to successfully reducing eating disorder behaviours, waiting times and attrition rates, the single session also substantially reduced costs in terms of staffing and resources.

It is possible that this benefit of a single-session assessment-based intervention could be enhanced further through the use of e-health technologies and interventions (Kazdin et al., 2017). Such technology-based interventions need to be accessible, acceptable, and effective, with the potential to enhance or augment evidence-based treatments. Davey et al. (2023) conclude that brief

and focused interventions can help to reduce the gap between the demand for treatment and the capacity to deliver it, and stress the value of even low intensity, single contact interventions for eating disorders (e.g., Schleider et al., 2023). Accessibility is particularly pertinent to the eating disorder population, as it can help with issues of ambivalence, long waiting times and their negative impact on prognosis, and lack of available or easily accessible services (BEAT, 2019). Research findings regarding the effectiveness of e-health interventions for eating disorders have been mixed (e.g., Fairburn & Rothwell, 2015; Loucas et al., 2014). More recently, however, the use of a more diverse range of media has been found to improve outcomes among non-underweight patients, though there is less evidence of such an effect for those with anorexia nervosa (Barakat et al., 2019). To summarise, the context and nature of the intervention (e.g., anonymity, privacy, accessibility, flexibility, and guidance) is relevant to acceptability and outcome, alongside user-related factors such as level of agency, autonomy, expectations, self-motivation, and attitudes (Yim & Schmidt, 2019). Therapist support (e.g., providing feedback) does not seem to enhance effectiveness, though it can increase patient satisfaction and acceptability (e.g., Aardoom et al., 2016).

This study will assess the impact of a post-assessment, pre-treatment guided e-health psychoeducational waiting list intervention, delivered via podcast to patients with bulimia nervosa or anorexia nervosa. This is an extension of the approach used by Tatham et al. (2016), which was delivered in group format (four weekly group sessions, each lasting 90 minutes). This guided e-health version was developed partly to increase accessibility in response to increasing demand and longer treatment waiting times, but also because the previous approach had been shown to be effective for patients with bulimia nervosa. It also led to good retention rates across both diagnostic groups whilst waiting for treatment, and therefore its utility when working with patients with anorexia nervosa merited consideration. This study therefore investigated whether the same psychoeducational content has positive effects when delivered via a more accessible podcast format, promoting both ownership and recovery. Based on previous findings (e.g., Barakat et al., 2019; Tatham et al., 2016), it is hypothesised that benefits will be found among non-underweight patients but not necessarily those with anorexia nervosa.

## **Method**

### **Design**

The study used a case series design, based on patients who attended a routine outpatient eating disorder clinic. To ensure comparability with Tatham et al. (2016), patients were included in the data set if they met diagnostic criteria for anorexia nervosa or bulimia nervosa.

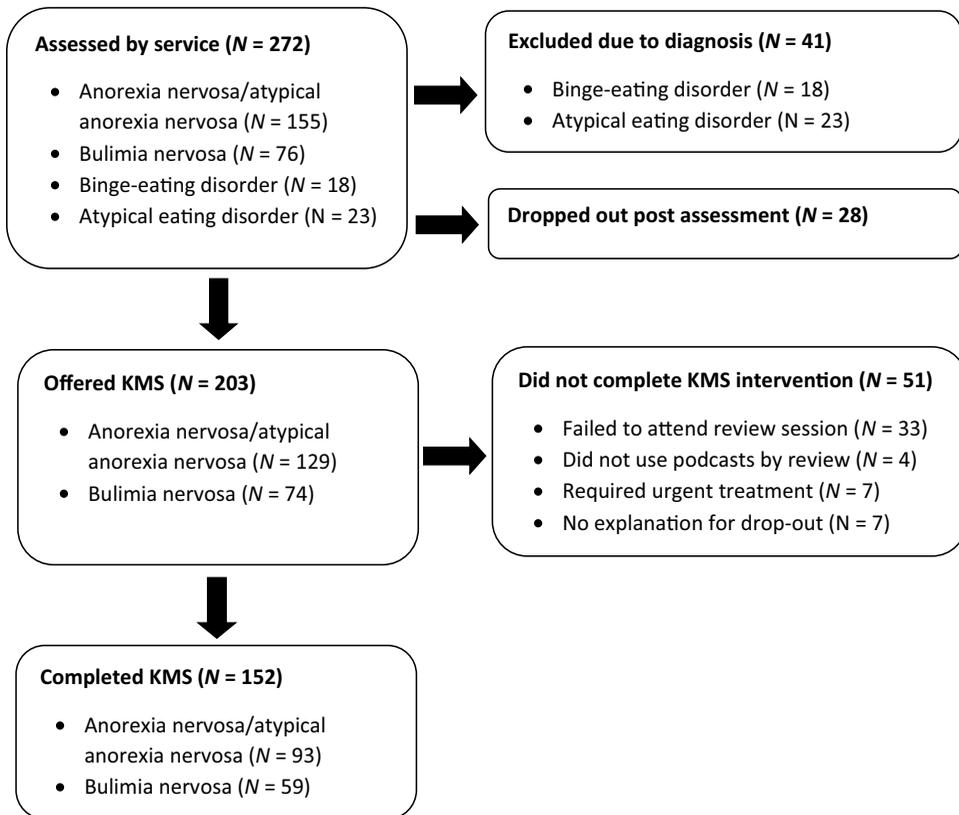
## Participants

The study was conducted in a UK National Health Service (NHS) specialist outpatient eating disorders service, which offered assessment and treatment of adult patients with moderate to severe eating disorders. Following NHS Research and Development guidance, no ethical permission was necessary as this was a confidential audit of NHS routine clinical practice. Sample size analysis (G\*Power v.3.1.9.2) was based on the small-medium effect size ( $d = 0.33$ ) for the EDE-Q Global score found by Tatham et al. (2016). Assuming  $p = .05$  and Power = 80%, a total sample size of  $N = 196$  was necessary for a  $2 \times 3$  design with repeated measures on one factor.

Between January 2016 and September 2019, a case series of 272 patients who met service criteria were assessed by the service. All were diagnosed by experienced clinicians, using DSM-5 criteria (American Psychiatric Association, 2013). Of those 272 patients, 155 met criteria for anorexia nervosa or atypical anorexia nervosa, and 76 met criteria for bulimia nervosa. A further 18 met diagnostic criteria for binge-eating disorder (BED). BED patients were excluded from this intervention following earlier patient feedback that some of the podcast information was unhelpful (such as material on starvation and compensatory behaviours), and so they received an adapted version of the intervention (workbook only). Finally, 23 patients were excluded due to not meeting criteria for any of the above disorders (e.g., diagnosed as having atypical eating disorders).

Not all patients received the podcast intervention, due to either dropping out without notice or requiring urgent treatment. Of the 231 patients with anorexia nervosa or bulimia nervosa, 203 (87.9%) entered the programme. Thus, the sample was adequately powered. These participants included 129 patients who met DSM-5 criteria for anorexia nervosa or atypical anorexia nervosa (restrictive subtype = 66 [all female]; binge/purge subtype = 28 [26 female, 2 male]; atypical anorexia nervosa = 35 [29 female, 6 male]). A further 74 patients met criteria for bulimia nervosa ( $N = 66$  [62 female, 4 male]). Overall, 12 participants were male (5.9%), and 191 were female (94.1%). All participants were aged 18 years or over, and they had a mean age of 25.1 years.

All 203 of the individuals who met criteria were entered into the dataset, using an intention to treat approach. Of the 203 patients, 51 did not complete the KMS programme. Some failed to attend the review session ( $N = 33$ ), though 11 of those went on to receive treatment thereafter. Another four attended the review session but had not listened to the podcasts. Seven had to start full treatment for their eating disorder urgently in the intervening time. The remainder opted out of the KMS intervention without explanation with Figure 1 shows uptake and engagement with the programme following assessment. Those who went on to start individual treatment waited on average a further 12 weeks (mean = 79.8 days) following the KMS review before their first treatment session. Patients did not receive any other intervention whilst waiting for treatment.



**Figure 1.** Consort diagram, showing flow of patients from assessment for keep myself safe (KMS) pre-treatment intervention to completion of intervention.

### **Procedure**

Patients were given details of the psychoeducational intervention at their assessment appointment. This included information orientating them to the programme, a link to the six podcasts, an accompanying workbook, and a date for a review appointment scheduled to take place three weeks later. Patients were asked to access and complete the intervention at their own pace over the coming three weeks (mean time taken for the intervention = 21.9 days). They completed measures at three time points (assessment- time point 0; following accessing the psychoeducation podcasts three weeks later- time point 1; and start of treatment—time point 0). Due to service configuration, continuity of clinician from assessment to start of treatment did not occur.

### **Psychoeducational intervention**

The ‘Keeping Myself Safe’ (KMS) programme (available from the first author) is a waiting list intervention. It includes six podcasts (total of 107 minutes) and

an accompanying workbook which patients are encouraged to complete alongside listening to the podcasts. It is followed by a 1:1 review appointment, during which the patient's engagement with the podcasts, completion of the workbook and progress is reviewed (KMS review, time point 1 in this study).

In keeping with the transdiagnostic model of eating disorders (Fairburn et al., 2003), the programme contains information relevant to the range of eating disorders. The content is based on the psychoeducational materials provided in Waller et al. (2007) and includes a patient recovery story from anorexia nervosa:

- *Podcast 1* (26:03 min): Eating disorder pathology and the effects of semi-starvation;
- *Workbook exercises*: Identifying behaviours and symptoms; Knowledge Quiz;
- *Podcast 2* (20:25 min): Motivational states, costs-benefits analysis, patient recovery story;
- *Workbook exercises*: Identifying current stage of change; Pros and cons of my eating disorder;
- *Podcast 3* (21:56 min): The role and risks of compensatory behaviours, and a 'Keeping Myself Safe plan' template, detailing participants' own risks, strategies and sources of support (including risk management and medical monitoring);
- *Workbook exercises*: Utilising harm-reduction strategies; completing the Keeping Myself Safe plan;
- *Podcast 4* (17:39 min): Food and energy requirements, regular eating;
- *Workbook exercises*: Identifying gaps—eating pattern; food groups;
- *Podcast 5* (5:14 min): Safe and feared foods, self-monitoring food diary template, binge eating;
- *Workbook exercises*: Identifying safe and unsafe foods; self-monitoring daily food intake;
- *Podcast 6* (16:24 min): Factors that influence weight and shape, myths of purging, body image concerns, a review of the 'keeping myself safe plan', and recommended self-help reading;
- *Workbook exercises*: Reflection on the relevance of the set point theory to me; Review/evaluation of feasibility and anticipated engagement with Keeping Myself Plan.

The workbook can be completed manually (downloaded) or online, and includes a "Keeping Myself Safe" plan, which patients complete towards the end of the programme. This is a personalised plan outlining strategies to minimise the harmful effects of their eating disorder and identifying natural sources of support to utilise while on the waiting list for treatment. Patients are asked to bring their completed workbook to the review appointment, during

which they are given guidance and supplementary advice about their individualised harm minimisation plan.

### ***Measures and procedure***

Data were collected at three time points—assessment, at the end of the KMS programme, and at the start of treatment. Primary outcome variables were body mass index (BMI) and eating attitudes (EDE-Q Global score). Weight and height were measured at assessment to yield BMI, and weight was measured again at the end of the KMS review (mean = 21.9 days later) and at the start of treatment (mean of 79.8 days later). Patients each completed the following measure of eating pathology at the same time points.

#### ***Eating disorder examination questionnaire 6.0 (EDE-Q 6.0; Fairburn, 2008)***

The EDE-Q is a 28-item self-report measure, used to assess key attitudes, feelings, and behaviours (including objective binge-eating, self-induced vomiting, and laxative misuse) found in the eating disorders. Each attitudinal item is rated on a seven-point scale over a 28-day timeframe. The measure addresses four domains of eating pathology, using a 0–6 Likert scale. Item mean scores are used (range 0–6)—Restraint, Shape Concern, Weight Concern, and Eating Concern. The overall scale (EDE-Q Global) was also used, based on the mean of the four subscales. Its Cronbach's alpha was strong for this sample, at 0.887. The EDE-Q behavioural items were all rated based on the previous 28 days.

### ***Data analysis***

SPSS v28 was used throughout. Outcomes were BMI, the EDE-Q subscale and Global scores, and the behavioural indices (objective binges, vomiting, laxative use) over the previous 28 days. A repeated measures (time x 3 levels) and group (anorexia nervosa vs bulimia nervosa) design was used. An ANOVA was not used, to obviate the problems of correlations between variables over time. Instead, Generalised Linear Mixed Models (GLMM) were used. These analyses are not affected by time-point interdependence of dependent variables and ensure that all available data are used. In order to determine whether drop-out had an influence, completer analyses (repeated measures ANOVAs) was used to determine whether the primary outcomes were the same for each group when only the completers were analysed.

## Results

### *Preliminary considerations for GLMM analyses*

Initially, the most appropriate data fit was determined for each variable, by determining which time function most closely fitted the data. The most appropriate distribution is indicated by the lowest  $-2$  Log Likelihood index score. Those scores are given in Table 1. In all cases, there were relatively small differences between the distributions, with the smallest being either the quadratic or logarithmic distribution. As there were limited differences and logarithmic fits are commonly found to be most appropriate in such intervention designs, the logarithmic distributions were used for all the following analyses.

### *GLMM models showing impact of keeping myself safe podcasts*

#### *Primary outcomes*

Table 2 shows the fixed effect outcomes from the GLMM models (time x diagnosis) for the primary outcomes (BMI and EDE-Q Global score). The main effects for these primary outcomes are shown in Figure 2. (In all such visual representations, main effects are shown unless the interaction term showed different outcomes over time for the two diagnostic groups.)

Both BMI and EDE-Q Global score showed main effects of time and diagnosis, but no reliable interaction. BMI was significantly higher in the bulimia nervosa group (as expected), and BMI rose significantly for the two groups overall, particularly after the KMS intervention (having been stable after assessment). However, while there was no interaction of time x diagnosis, it is noteworthy that BMI did not change over time for the anorexia nervosa group

While the interaction of time and diagnosis for the EDE-Q Global score approached significance ( $p = .053$ ), it could not be interpreted as reliable.

**Table 1.** Indicators of best time function ( $-2$  log likelihood) to use in the GLMM analyses.

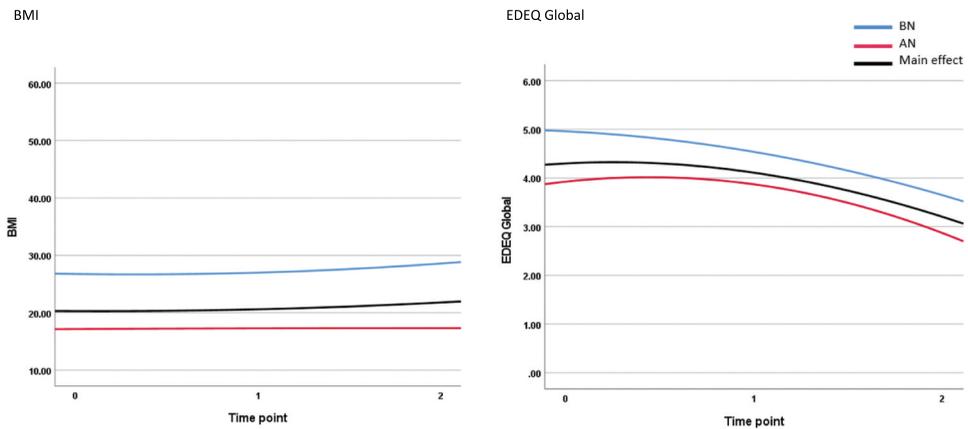
Outcome	Linear	Quadratic	Cubic	Logarithmic (LN)
Body Mass Index	2202.32	2231.44	2222.76	2196.34
<b>Eating Disorders Examination-Q scales</b>				
Restraint	1180.75	1180.34	1188.19	1184.93
Eating concern	1068.28	1065.97	1070.62	1071.17
Shape concern	995.45	990.85	993.80	998.61
Weight concern	1071.94	1062.40	1065.17	1077.74
Global	977.14	971.09	977.36	983.88
Binge frequency	1937.55	1935.92	1956.68	1939.44
Vomiting	2356.00	2358.77	2363.03	2354.91
Laxative use	1922.84	1927.16	1931.09	1920.29
Excessive exercise	2037.00	2039.14	2042.49	2035.58

## Secondary outcomes

Table 2 also shows the fixed effect outcomes from the GLMM models (time x diagnosis) for the secondary outcomes (EDE-Q scales and behaviours). All the scales and behaviours (apart from Exercise) showed the same pattern of main effects for both time and diagnosis. However, there were also significant

**Table 2.** GLMM fixed effect outcomes for Body Mass Index (BMI) and eating disorders examination-questionnaire (EDE-Q) scales.

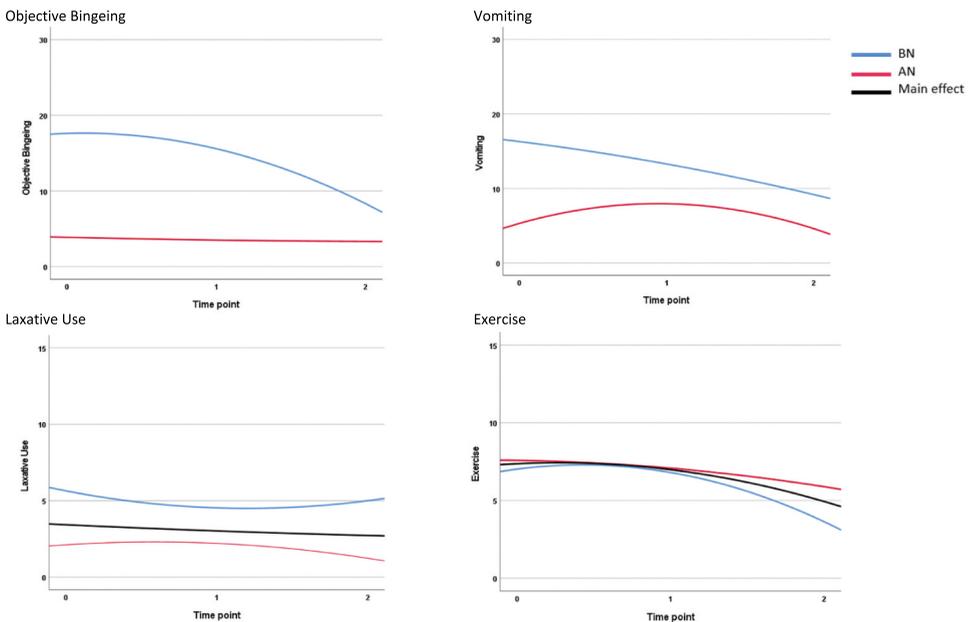
Measure and source	F	df1	df2	P
<i>BMI</i>				
Corrected model	50.115	3	393	<.001
Diagnosis	128.783	1	393	<.001
TimeLN	12.758	1	393	<.001
TimeLN*Diagnosis	2.493	1	393	0.115
<i>EDEQ-Global</i>				
Corrected model	28.274	3	322	<.001
Diagnosis	25.086	1	322	<.001
TimeLN	64.343	1	322	<.001
TimeLN*Diagnosis	3.770	1	322	0.053
<i>EDEQ-Restriction</i>				
Corrected model	22.601	3	324	<.001
Diagnosis	9.082	1	324	0.003
TimeLN	62.338	1	324	<.001
TimeLN*Diagnosis	4.007	1	324	0.046
<i>EDEQ-Eating Control</i>				
Corrected model	21.641	3	323	<.001
Diagnosis	35.277	1	323	<.001
TimeLN	35.287	1	323	<.001
TimeLN*Diagnosis	7.467	1	323	0.007
<i>EDEQ-Shape Control</i>				
Corrected model	14.058	3	324	<.001
Diagnosis	14.301	1	324	<.001
TimeLN	28.104	1	324	<.001
TimeLN*Diagnosis	0.560	1	324	0.455
<i>EDEQ-Weight Control</i>				
Corrected model	22.202	3	324	<.001
Diagnosis	21.743	1	324	<.001
TimeLN	42.030	1	324	<.001
TimeLN*Diagnosis	0.142	1	324	0.706
<i>EDEQ-Bingeing</i>				
Corrected model	42.675	3	279	<.001
Diagnosis	105.455	1	279	<.001
TimeLN	22.028	1	279	<.001
TimeLN*Diagnosis	9.878	1	279	0.002
<i>EDEQ-Vomiting</i>				
Corrected model	7.088	3	286	<.001
Diagnosis	9.815	1	286	0.002
TimeLN	12.949	1	286	<.001
TimeLN*Diagnosis	3.965	1	286	0.047
<i>EDEQ-Laxative Use</i>				
Corrected model	4.686	3	293	0.003
Diagnosis	7.026	1	293	0.008
TimeLN	7.563	1	293	0.006
TimeLN*Diagnosis	1.874	1	293	0.172
<i>EDEQ-Exercise</i>				
Corrected model	2.195	3	286	0.089
Diagnosis	0.054	1	286	0.817
TimeLN	6.243	1	286	0.013
TimeLN*Diagnosis	0.002	1	286	0.961



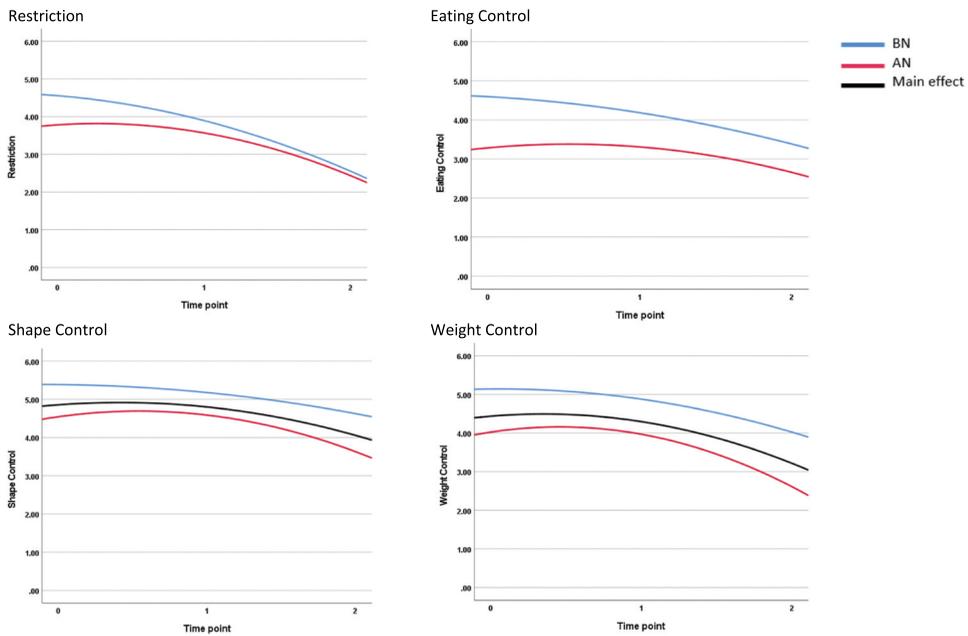
**Figure 2.** Primary outcome measures (time point 0 = assessment; time point 1 = end of KMS review; time point 2 = beginning of treatment).

interactions of time x diagnosis for the Restriction and Eating Control attitudinal scales, and for Bingeing and Vomiting behaviours. In each of those cases, the interactions subsume the main effects.

Figures 3 and 4 explain those effects. In Figure 3, Bingeing was stable over time for the anorexia nervosa group but fell substantially after the KMS intervention for the bulimia nervosa patients. In contrast, vomiting fell across the time points for the bulimia nervosa group. In the anorexia nervosa group,



**Figure 3.** Frequency of eating disorder behaviours (time point 0 = assessment; time point 1 = end of KMS review; time point 2 = beginning of treatment).



**Figure 4.** Eating disorder examination-questionnaire subscale scores (time point 0 = assessment; time point 1 = end of KMS review; time point 2 = beginning of treatment).

vomiting rose following assessment then fell back after the KMS intervention for the anorexia nervosa group. For laxative use, the overall pattern over time was a small decline across the whole timeframe, but the bulimia nervosa group used vomiting more overall. Exercise levels reduced over time, but only after the KMS intervention.

In [Figure 4](#), the two significant interactions showed the same pattern. Restriction and Eating control fell for both groups (particularly after the KMS intervention), but more so for the bulimia nervosa patients. For Weight control and Shape control, the bulimia nervosa group scored higher than the anorexia nervosa group across time, and both groups showed a reduction after the KMS intervention.

### Completer analyses

Completer analyses (repeated measures ANOVA, using the same three time points as for the GLMM analyses) were conducted to determine whether the pattern of outcomes was different if only considering those who completed treatment. To reduce the risk of Type 1 errors, this was done for the primary outcome variables only. Anorexia nervosa and bulimia nervosa were considered separately in each case. Considering the primary outcome of BMI, there were no differences over time for anorexia nervosa ( $F = 2.03$ ;  $p = .157$ ) or bulimia nervosa ( $F = 3.06$ ;  $p = .09$ ).

Therefore, in this analysis, there was no difference for the anorexia nervosa group, while the bulimia nervosa group failed to achieve significant increase in BMI. For the other primary outcome (EDE-Q Global scores), there were reductions over time for the anorexia nervosa ( $F = 6.65$ ;  $p = .007$ ) and bulimia nervosa ( $F = 20.3$ ;  $p < .001$ ) groups, as found in the GLMM analyses. To summarise, the results were broadly similar across intention to treat and completer analysis approaches, though weight gain in bulimia nervosa was not found when considering only those who completed therapy.

### **Summary**

Overall, at baseline, the bulimia nervosa group had higher levels of pathology on the attitudinal and behavioural measures, while the anorexia nervosa group had a lower BMI. Both clinical groups showed a broad pattern of lowering of scores, but primarily after the KMS intervention. This applied to the group as a whole, and to the completer group only. Most importantly, the bulimia nervosa group were more responsive to the KMS intervention on a number of indices (bingeing, vomiting, restriction, eating control), in keeping with the findings of Tatham et al. (2016).

### **Discussion**

This case series study examined the impact of a pre-treatment guided e-health podcast psychoeducation intervention ('Keeping Myself Safe') within a mixed eating disorder population. There was a general effect of time, showing positive symptom changes after the KMS intervention (rather than simply after the assessment). However, on a number of attitudinal and behavioural indices, the effect of the KMS was stronger for the bulimia nervosa group, aligning with Tatham et al. (2016) findings. While the changes in eating behaviours and attitudes were not large, they were relatively positive for such a low-intensity, e-health psychoeducational intervention. Indeed, large clinical improvements would not be anticipated in such a pre-treatment intervention and the improvements were at a comparable level with those reported by Fursland et al. (2018), except for BMI for the anorexia nervosa patients, which increased in Fursland's intervention. However, it is important to note that the use of a case series design limits the causal interpretations that can be made, due to the lack of a control condition.

Combined with Fursland's approach to assessment (Fursland et al., 2018), these clinical changes offer the potential to initiate early change ahead of therapy for eating disorders. Given the importance of early change (Vall & Wade, 2015), this accessible psychoeducation intervention has the potential to contribute to more substantial long-term outcomes in

psychological therapies for eating disorders, particularly among bulimia nervosa patients.

It is likely that the podcast formats' effect was enhanced by the greater autonomy and privacy over where and when patients chose to access information, possibly leading to greater feelings of self-efficacy or responsibility (Yim & Schmidt, 2019). Furthermore, the podcast includes several features that are likely to enhance the effectiveness of e-health interventions (Barakat et al., 2019), including the interactive element in the accompanying workbook and the face-to-face review that allows for feedback and guidance (e.g., the “Keeping Myself Safe” harm minimisation plan). Finally, the addition of a personal recovery story from anorexia nervosa might have increased motivation and optimism amongst these patients.

While these findings provide further support for the early use of psychoeducation with patients with eating disorders, it is important to note that the study is methodologically limited. Further research is needed to test these conclusions, particularly through use of a randomised controlled design. It will also be important to measure the level of adherence by individual patients, to determine the dose-related nature of any outcomes. Systematic data on some clinical features were not collected and the use of self-reported measures limits the conclusions that can be reached. In future research, it will be important to determine whether these findings apply to patients across the age range, and among those with lower BMIs, a longer history of treatment, and different comorbidities. Expanding the range of measures used could also be considered in future research (e.g., motivational measures; general psychopathology). Finally, further research is needed to assess whether this approach results in more effective engagement and change once subsequent treatment is delivered, and whether psychoeducation is best delivered immediately before therapy starts or at any time pre-treatment.

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## **Data statement**

The data used are available on reasonable request to the corresponding author.

## Author contributions

MT conceptualised the paper and oversaw data collection. HW collected and organised the data and contributed to the data analysis and the writing of drafts. JB conducted the core data analyses and contributed to drafting the paper. GW led on the data analysis and oversaw the writing of drafts. All four authors contributed to the writing of the final report and approved the submitted version.

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