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Inpatient versus outpatient care, partial hospitalisation and waiting list for people with eating disorders (Review)

Hay PJ, Touyz S, Claudino AM, Lujic S, Smith CA, Madden S

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TABLE OF CONTENTS

HEADER 1
ABSTRACT 1
PLAIN LANGUAGE SUMMARY 2
SUMMARY OF FINDINGS 4
BACKGROUND 6
OBJECTIVES 8
METHODS 8
RESULTS 12
Figure 1. 13
Figure 2. 16
Figure 3. 17
DISCUSSION 20
AUTHORS' CONCLUSIONS 21
ACKNOWLEDGEMENTS 21
REFERENCES 23
CHARACTERISTICS OF STUDIES 27
DATA AND ANALYSES 38
Analysis 1.1. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 1 Weight or BMI at end of treatment. 39
Analysis 1.2. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 2 Acceptibility: number of participants who completed treatment. 40
Analysis 1.3. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 3 Clinical response: end of treatment weight restoration to within the normal range. 41
Analysis 1.4. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 4 Recovery: a level of intermediate or better on Morgan-Russell broad or narrow scale. 41
Analysis 1.5. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 5 Depression: symptom severity. 42
Analysis 1.6. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 6 General psychiatric symptom severity. 43
Analysis 1.7. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 7 Weight or BMI at one year following end of treatment or two years since baseline. 43
Analysis 2.1. Comparison 2 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus waiting list, no active treatment, or treatment as usual (TAU), Outcome 1 General psychiatry symptom severity. 44
Analysis 3.1. Comparison 3 Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care, Outcome 1 Weight or BMI at end of treatment. 44
Analysis 3.2. Comparison 3 Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care, Outcome 2 Acceptability: number of participants who completed treatment. 45
Analysis 3.3. Comparison 3 Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care, Outcome 3 Clinical response: end of treatment weight restoration to within the normal range. 45
Analysis 3.4. Comparison 3 Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care, Outcome 4 Recovery: a level of intermediate or better on Morgan-Russell narrow or broad scale. 45
Analysis 3.5. Comparison 3 Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care, Outcome 5 General psychiatric symptom severity. 46
Analysis 3.6. Comparison 3 Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care, Outcome 6 Total cost of care to end of treatment. 46
Analysis 4.1. Comparison 4 Specialist inpatient care for bulimia nervosa, binge eating disorder, or other specified feeding or eating disorder (OSFED) bulimia nervosa or binge eating disorder type versus partial hospital care, Outcome 1 Binge eating: frequency. 47
Analysis 4.2. Comparison 4 Specialist inpatient care for bulimia nervosa, binge eating disorder, or other specified feeding or eating disorder (OSFED) bulimia nervosa or binge eating disorder type versus partial hospital care, Outcome 2 Acceptability: number of participants who completed treatment. 47

Analysis 4.3. Comparison 4 Specialist inpatient care for bulimia nervosa, binge eating disorder, or other specified feeding or eating disorder (OSFED) bulimia nervosa or binge eating disorder type versus partial hospital care, Outcome 3 Binge eating: abstinence. 47
Analysis 4.4. Comparison 4 Specialist inpatient care for bulimia nervosa, binge eating disorder, or other specified feeding or eating disorder (OSFED) bulimia nervosa or binge eating disorder type versus partial hospital care, Outcome 4 General psychiatric symptom severity. 47
Analysis 4.5. Comparison 4 Specialist inpatient care for bulimia nervosa, binge eating disorder, or other specified feeding or eating disorder (OSFED) bulimia nervosa or binge eating disorder type versus partial hospital care, Outcome 5 Binge eating frequency one year following end of treatment or two years since baseline.. 48
ADDITIONAL TABLES 48
APPENDICES 48
WHAT'S NEW 61
HISTORY 61
CONTRIBUTIONS OF AUTHORS 62
DECLARATIONS OF INTEREST 62
SOURCES OF SUPPORT 62
DIFFERENCES BETWEEN PROTOCOL AND REVIEW 62
INDEX TERMS 63

[Intervention Review]

Inpatient versus outpatient care, partial hospitalisation and waiting list for people with eating disorders

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ABSTRACT

Background

Clinical guidelines recommend outpatient care for the majority of people with an eating disorder. The optimal use of inpatient treatment or combination of inpatient and partial hospital care is disputed and practice varies widely.

Objectives

To assess the effects of treatment setting (inpatient, partial hospitalisation, or outpatient) on the reduction of symptoms and increase in remission rates in people with:

1. Anorexia nervosa and atypical anorexia nervosa;

2. Bulimia nervosa and other eating disorders.

Search methods

We searched Ovid MEDLINE (1950-), Embase (1974-), PsycINFO (1967-) and the Cochrane Central Register of Controlled Trials (CENTRAL) to 2 July 2018. An earlier search of these databases was conducted via the Cochrane Common Mental Disorders Controlled Trial Register (CCMD-CTR) (all years to 20 November 2015). We also searched the WHO International Clinical Trials Registry Platform and ClinicalTrials.gov (6 July 2018). We ran a forward citation search on the Web of Science to identify additional reports citing any of the included studies, and screened reference lists of included studies and relevant reviews identified during our searches.

Selection criteria

We included randomised controlled trials that tested the efficacy of inpatient, outpatient, or partial hospital settings for treatment of eating disorder in adults, adolescents, and children, whose diagnoses were determined according to the DSM-5, or other internationally accepted diagnostic criteria. We excluded trials of treatment setting for medical or psychiatric complications or comorbidities (e.g. hypokalaemia, depression) of an eating disorder.

Data collection and analysis

We followed standard Cochrane procedures to select studies, extract and analyse data, and interpret and present results. We extracted data according to the DSM-5 criteria. We used the Cochrane tool to assess risk of bias. We used the mean (MD) or standardised mean difference (SMD) for continuous data outcomes, and the risk ratio (RR) for binary outcomes. We included the 95% confidence interval (CI) with each result. We presented the quality of the evidence and estimate of effect for weight or body mass index (BMI) and acceptability (number who completed treatment), in a 'Summary of findings' table for the comparison for which we had sufficient data to conduct a meta-analysis.

Main results

We included five trials in our review. Four trials included a total of 511 participants with anorexia nervosa, and one trial had 55 participants with bulimia nervosa. Three trials are awaiting classification, and may be included in future versions of this review. We assessed a risk of bias from lack of blinding of participants and therapists in all trials, and unclear risk for allocation concealment and randomisation in one study.

We had planned four comparisons, and had data for meta-analyses for one. For anorexia nervosa, there may be little or no difference between specialist inpatient care and active outpatient or combined brief hospital and outpatient care in weight gain at 12 months after the start of treatment (standardised mean difference (SMD) -0.22, 95% CI -0.49 to 0.05; 2 trials, 232 participants; low-quality evidence). People may be more likely to complete treatment when randomised to outpatient care settings, but this finding is very uncertain (risk ratio (RR) 0.75, 95% CI 0.64 to 0.88; 3 trials, 319 participants; very low-quality evidence). We downgraded the quality of the evidence for these outcomes because of risks of bias, small numbers of participants and events, and variable level of specialist expertise and intensity of treatment.

We had no data, or data from only one trial for the primary outcomes for each of the other three comparisons.

No trials measured weight or acceptance of treatment for anorexia nervosa, when comparing inpatient care provided by a specialist eating disorder service and health professionals and a waiting list, no active treatment, or treatment as usual.

There was no clear difference in weight gain between settings, and only slightly more acceptance for the partial hospital setting over specialist inpatient care for weight restoration in anorexia nervosa.

There was no clear difference in weight gain or acceptability of treatment between specialist inpatient care and partial hospital care for bulimia nervosa, and other binge eating disorders.

Authors' conclusions

There was insufficient evidence to conclude whether any treatment setting was superior for treating people with moderately severe (or less) anorexia nervosa, or other eating disorders.

More research is needed for all comparisons of inpatient care versus alternate care.

PLAIN LANGUAGE SUMMARY

Inpatient hospital care compared to outpatient or day care for people with eating disorders

Why is this review important?

International clinical practice guidelines recommend that overall, people with eating disorders should receive their treatment in an outpatient setting. Most people also prefer to avoid a hospital admission, as it takes more time and resources. However, it is not known if outpatient care is as effective as more intensive inpatient or partial (day) hospital care, or if it is more acceptable for people. Those who are at medical or psychiatric risk of harm or suicide, and those with anorexia nervosa who are severely underweight or rapidly losing weight may not be safe in an outpatient setting.

Who will be interested in this review?

People with lived experience of eating disorders and people who care for them will be interested in this review.

Which studies were included in the review?

We searched medical databases and trial registers to find randomised controlled studies that compared inpatient care to partial hospital care or outpatient care, alone or in combination, to July 2018. We included four trials that included 511 people with anorexia nervosa, and one trial of 55 people with bulimia nervosa.

What does the evidence from the review tell us?

There was not enough evidence from trials to support any one setting for people with anorexia nervosa, bulimia nervosa, or other eating disorders. There was no clear difference in weight gain for people with anorexia nervosa who were treated in different settings, but they

seemed more likely to complete treatment when some or all of it was offered in settings outside the hospital. The evidence was low or very low-quality, so we are uncertain about these results.

What should happen next?

We need more trials comparing inpatient to outpatient or day care for people with anorexia nervosa and other eating disorders, when it is medically safe to consider less intensive care settings.

SUMMARY OF FINDINGS

Summary of findings for the main comparison. Summary of findings: Specialist inpatient care for weight restoration compared with active outpatient or combination brief hospital/outpatient care

Specialist inpatient care for weight restoration compared with active outpatient or combination brief hospital and outpatient care

Patient or population: participants with anorexia nervosa

Settings: specialist services referral centres

Intervention: specialist inpatient care

Comparison: outpatient or limited inpatient care, followed by outpatient care

Outcomes	Illustrative comparative risks (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Outpatient care	Specialist inpatient care versus specialist or non-specialist outpatient care, or partial hospitalisation for people with anorexia nervosa				
Weight or BMI (at end of 12 months from the start of treatment)	The mean weight or BMI for participants in the outpatient groups was .14 lower (.61 lower to .33 higher)	The mean weight or BMI for participants in the intervention groups was 0.22 SD lower (0.49 lower to 0.05 higher)	SMD -0.22 (-0.49 to 0.05)	232 (2)	**low**[1] ⊕⊕⊖⊖	SD of 0.2 represents a small difference between groups
Acceptability: number of participants who completed treatment (at end of 12 months from the start of treatment)	Study population		RR 0.75 (0.64 to 0.88)	319 (3)	**very low**[2] ⊕⊖⊖⊖	
	785 per 1000	**605 per 1000** (from 495 to 738)				
	Moderate					
	810 per 1000	**624 per 1000** (from 510 to 761)				

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: confidence interval; **SMD:** standardised mean difference; **RR:** risk ratio; **BMI:** body mass index

GRADE Working Group grades of evidence (Higgins 2011)
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate

[1] Quality of the evidence downgraded two points for small numbers of trials, and variable level of specialist expertise and intensity of treatment in comparator conditions.
[2] Quality of the evidence downgraded three points for high risk of bias present in one of three trials, small numbers of trials, and variable level of specialist expertise and intensity of treatment in comparator conditions.
NOTE: All calculations are with the GRADEPro GDT software (GRADEpro GDT 2015).

BACKGROUND

Description of the condition

Eating disorders are a group of diagnoses defined by severe disturbances in eating behaviour, and include anorexia nervosa, bulimia nervosa, binge eating disorder, and other specified or unspecified eating disorders (APA 2013; WHO 1992). Anorexia nervosa is an eating disorder with features of weight loss or failure to gain weight. This leads to a weight that is less than 85% of that expected for height and age, an intense fear of gaining weight, a distorted body image, and the absence of at least three consecutive menstrual cycles. Bulimia nervosa, by definition, is a disorder of normal or above normal weight, characterised by binge eating and extreme weight control methods to compensate for the binge eating. Recurrent binge eating is defined as eating unusually large amounts of food, over which there is a sense of loss of control. The compensatory extreme weight control behaviours may take the form of self-induced vomiting, laxative or diuretic use, or a combination (purging), or fasting, with or without intense exercise (the non-purging form of bulimia nervosa). In addition to disordered eating behaviours, people with bulimia nervosa also have specific eating disorder psychopathology, whereby their self-view or self-evaluation is unduly influenced by concerns about their weight, shape, or body image, alone or in combination. Other eating disorders may share the body image, shape, and weight concerns of those with anorexia nervosa or bulimia nervosa, with or without the disordered eating or weight control behaviours. Patients with binge eating disorder have regular binge eating behaviours, but do not have regular extreme weight control behaviours. Other specified eating disorders include atypical anorexia nervosa (where the person's weight is in or above the normal range), bulimia nervosa or binge eating disorder of low frequency or limited duration (or both), purging disorder, and night eating syndrome. Finally, unspecified feeding or eating disorder is a heterogeneous category, where patients do not meet the criteria for an eating disorder, but have a clinical eating or feeding disorder syndrome. It most usually comprises people with disordered eating behaviours or body image disturbances (or both), characteristic of the better defined disorders.

This review did not address feeding disorders, such as avoidant restrictive food intake disorder, which are categorised with eating disorders in the new DSM-5 diagnostic scheme (APA 2013; WHO 1992).

Eating disorders are common (Hoek 2003; Hudson 2007), and increasing (Lucas 1991; Hay 2008). A national US survey found lifetime prevalence estimates of anorexia nervosa, bulimia nervosa, and binge eating disorder to be 0.9%, 1.5%, and 3.5% respectively among women, and 0.3%, 0.5%, and 2.0% among men (Hudson 2007). In Australia, between 1995 and 2005, there was a two-fold increase in the point prevalence of eating disorder behaviours in the general community (Hay 2008).

Description of the intervention

Treatments for eating disorders have been developed for outpatient, inpatient and partial hospitalisation (the latter is also known as day hospital care). Clinical practice guidelines vary on recommendations, but there is some consensus that inpatient care is most often needed for people with anorexia nervosa (NICE 2004; RANZCP 2014). Bulimia nervosa and other eating disorders seldom require an admission unless there are medical complications, e.g. hypokalaemia or high suicide intent (APA 2006; NICE 2004; RANZCP 2014). Inpatient programmes are usually multidisciplinary (where treatment providers include a combination of psychologists, psychiatrists, dietitians, nurses, and other allied health care specialists), and involve a programme of nutritional counselling and supervised meals, combined with individual and group psychotherapy, and medical care (La Puma 2009). Partial hospitalisation is similar to inpatient programmes with regards to multidisciplinary care, intensity of therapy, the capacity for regular supervision of meals, and the direct provision of meals (Thornton 2009). However, there is no overnight stay with partial hospitalisation. In contrast, outpatient care does not provide regular meal supervision. In outpatient care, therapy is also usually less frequent (e.g. occurring between one and two times a week), and care is less likely to include therapists from multiple disciplines. Indeed, in outpatient programmes, care may be delivered by a single therapist from one discipline, e.g. a psychologist. An overview of the different components of care across treatment settings is found in Table 1.

There is no one psychotherapeutic approach that is applied consistently in outpatient care world-wide, although cognitive behaviour therapy has the best evidence base for bulimia nervosa (Hay 2009; NICE 2004). In adolescents and children, a family-based approach is regarded as the first line in treatment (NICE 2004). It has been found superior to treatment as usual, but there is insufficient evidence to support any single form of family therapy (Fisher 2010). Derivations of the Maudsley model (as described in Le Grange 2005 and Rhodes 2009) have gained ascendancy worldwide. This is in part because they are manualised and thus provide a high level of detailed guidance for therapists as well as a standardised treatment for reproducibility in research trials (Lock 2001).

Medical care comprises physician and nursing management of physical aspects of eating disorders. This includes refeeding and the management of osteopenia and other effects from starvation. A comprehensive account of medical management is provided in the text by Birmingham and Treasure (Birmingham 2010). Medications for physical or psychological comorbidities are seldom used as stand-alone treatments, but will often be used as part of inpatient or outpatient programmes. Evaluations of the relative efficacy of medications in eating disorders are also found in Flament 2012 and Hay 2012. These reviews reported generally weak or moderate strength evidence for the efficacy of drug treatments, with generally low recovery rates. However, there was support for the use of antidepressants, particularly high dose fluoxetine, in bulimia nervosa, and of anticonvulsants (topiramate) for binge eating disorder. Attrition rates were usually higher than for psychotherapies, and combined treatments led to better outcomes than either approach alone for both bulimia nervosa and binge eating disorder. Low dose antipsychotic medication was considered to be possibly clinically useful as adjunct treatment for anxiety in anorexia nervosa, but more trials were needed.

Further details of psychological approaches in treatment may be found in complementary Cochrane Reviews of family therapy (Fisher 2010), and individual outpatient psychotherapies for anorexia nervosa (Hay 2015), and other eating disorders (Hay 2009). There are also three Cochrane Reviews on the use of antidepressant medication; one for bulimia nervosa (Bacaltchuk 2003), one for

anorexia nervosa (Claudino 2006), and one on a combination of medication and psychotherapies for bulimia nervosa (Hay 2001).

However, whilst there is a growing evidence base for treatments (albeit still sparse in anorexia nervosa (Lock 2009)), many patients with eating disorders fail to access treatment. Up to half of the people with anorexia nervosa may never present for treatment (Keski-Rahkonen 2007), and attrition in anorexia nervosa treatment trials can be unacceptably high, with reasons for drop-out difficult to identify (Halmi 2005). Stigma and perceived fear of hospitalisation may contribute to underuse of services. Where trials have compared inpatient with outpatient care, they have found preference for the latter (Freeman 1992), and higher attrition in the former (Gowers 2007). Professional bodies have also expressed their concerns, for example in a position statement by the Australian and New Zealand Academy for Eating Disorders (www.anzaed.org.au/uploads/7/3/9/2/7392147/positionstatementinpatient.pdf), that inpatient care may be underused, undervalued, or both, leading to a reduction in services. Whilst many jurisdictions do not currently provide inpatient services, lack of evidence hampers the ability to argue in their favour.

How the intervention might work

There is consensus that therapy for eating disorders includes dietetic, medical, nursing, and psychological care. In anorexia nervosa, guidelines call for multi-disciplinary care to provide the required level of expertise in medical or physical care, individual or group psychotherapy, and refeeding (NICE 2004). Medical or physical care may be provided by a paediatrician or general practitioner; individual and group therapy can be led by a psychologist, psychiatrist, or other therapist; and refeeding can be led by a dietician (Steinhausen 2002; Zipfel 2000).

Inpatient and partial hospitalisation have the benefit of being able to provide care for extended periods (6 to 24 hours a day). Notably, meals can be directly supervised, and staff can respond quickly to psychiatric or physical emergencies (such as refeeding syndrome (La Puma 2009; Treasure 2005)). Although exact mechanisms are unclear, there is consensus that greater intensity of therapy (increased number and duration of therapeutic sessions) leads to more rapidly gained psychological insight and skills (RANZCP 2014). Direct meal supervision provides psychological support during eating, a stressful time in refeeding regimes, and increases adherence to the prescribed meal plan.

However, outpatient care is argued to be both more effective, and efficient in therapy time and cost. Fairburn described a comprehensive outpatient approach in his treatment manual for underweight, normal, or overweight patients with eating disorders (Fairburn 2008). Such treatment is usually provided where inpatient care for medical or psychiatric crises (e.g. hypokalaemia due to vomiting or active suicidal ideation) is available. Admissions are for brief stabilisation periods, prior to resuming outpatient care.

It is thought that outpatient care preserves the patient's sense of autonomy, and is perceived as collaborative. Therefore, there is increased patient acceptability, and less risk of further psychological harm to a patient's already fragile self-esteem. It may also be associated with less stigma, and improved maintenance of usual social and work (including educational) activities.

Partial hospitalisation has the advantage of providing increased intensity of care (and supported or supervised meals) found in inpatient services, while enabling increased personal autonomy and continuation of life activities that are associated with outpatient care. However, it costs more than outpatient care.

Why it is important to do this review

Eating disorders have high social, medical, and fiscal costs (Crow 2003). For example, in Australia, they are the twelfth leading cause of mental health hospitalisation expenses (Mathers 1999). Guidelines agree that the more intensive care of a hospital admission is mandatory when there is high medical or psychiatric risk (APA 2006; NICE 2004; RANZCP 2014). However, its advantage when patients may be safely cared for as an outpatient is unproven. Outpatient care may also be preferred by people with an eating disorder for its perceived advantages. These include a more collaborative approach, with reduced stigma, the ability to maintain work and educational activities, and social relationships, and fiscal savings. Admission leads to a loss of usual social contacts, and interruption to work or education. Cost savings associated with avoiding or reducing hospitalisation to that needed for medical stabilisation alone, could be large. For example, a UK study found that outpatient care costs approximately 10% of the cost of inpatient care (Katzman 2000). A recent systematic review reported that internationally, annual healthcare costs ranged between €2993 to €55,270 for anorexia nervosa (AN), €888 to €18,823, for bulimia nervosa (BN), and €1762 to €2902 for binge eating disorder (BED; two studies), with length of hospital stay usually longer for AN than BN (15.0 days to 52.7 days versus 9.0 days to 45.7 days (Ágh 2016)). Direct comparisons of costs per day of inpatient versus outpatient care were not provided, however, studies that have reported or considered costs per day for local jurisdictions support the contention that these are much higher for inpatient than outpatient care (Herpertz-Dahlmann 2014; Madden 2014).

However, there are few studies on the role of treatment settings in eating disorders, and these are largely confined to anorexia nervosa, where the strength of the evidence is weak (Watson 2013; Zipfel 2015). A very early trial reported similar outcomes from inpatient and outpatient management (Crisp 1991). In addition, although hospitalisation is effective in the short-term, a 20-year retrospective study found it was not predictive of long-term recovery (Zipfel 2000). Previous systematic reviews have found results from studies of anorexia nervosa to be contradictory (Lock 2009; Meads 1999; Meads 2001). While some have found higher weight on discharge to be associated with better long-term weight outcomes (Barren 1995; Gross 2000; Zipfel 2000), one trial linked hospital admissions with poorer weight outcomes (Gowers 2000). The German national guideline, based on evidence from non-randomised clinical trials, advised treatment in hospital to continue until weight was fully restored (Herpetz 2011). In light of very limited evidence, the American Psychiatric Association (APA) guideline advised outpatient care for anorexia nervosa only when people were highly motivated, had supportive families, and had only been diagnosed for a short time (APA 2006). They also advised careful monitoring of outpatient care with transfer to a more intensive setting within weeks if there was no clinical improvement. The NICE 2004 guideline from the UK was more supportive of outpatient care as the treatment setting for the majority of people with anorexia nervosa. All guidelines agreed that outpatient care was the setting of choice for people with other eating disorders,

but research was needed into the appropriate use of more intensive inpatient, or partial hospital treatment settings (APA 2006; Herpetz 2011; NICE 2004; RANZCP 2014).

The aim of this review was to investigate whether there was a demonstrable benefit to inpatient compared to outpatient or day patient care for people with eating disorders, beyond that which was essential for treating acute medical and psychiatric presentations. We included a treatment setting where there was a combination of inpatient care with medical stabilisation, and the initiation of active treatments for the eating disorder (i.e. a refeeding regime for underweight patients), followed by discharge to outpatient care before treatment of the eating disorder and weight regain was complete. This review extended the work of previous systematic reviews in anorexia nervosa (Lock 2009; Meads 1999; Meads 2001), and further strengthened the portfolio of Cochrane Reviews in anorexia nervosa and other eating disorders (Bacaltchuk 2003; Claudino 2006; Fisher 2010; Hay 2001; Hay 2009; Hay 2015; Perkins 2006; Pratt 2002).

OBJECTIVES

To assess the effects of treatment setting (inpatient, partial hospitalisation, or outpatient) on the reduction of symptoms and increase in remission rates in people with:

1. Anorexia nervosa and atypical anorexia nervosa;

2. Bulimia nervosa and other eating disorders.

Secondary objective

1. To assess the effects of continuing hospitalisation until the patient is restored to a normal weight in people with anorexia nervosa.

METHODS

Criteria for considering studies for this review

Types of studies

Parallel design, randomised controlled trials. We excluded cross-over and cluster-randomised trials.

Types of participants

Adults, adolescents, and children with a diagnosis of acute anorexia nervosa, bulimia nervosa, binge eating disorder, or specified or unspecified eating disorder, according to DSM-5 (APA 2013), ICD-10 (WHO 1992), or other internationally accepted diagnostic criteria, such as the DSM-IV (APA 2000).

We did not exclude trials because of comorbidities or use of medication.

Types of interventions

Experimental interventions

See Table 1 for details.

1. Inpatient care for weight restoration in anorexia nervosa provided by a specialist service for eating disorders and health professionals

2. Inpatient care for bulimia nervosa and other eating disorders by a specialist service for eating disorders and health professionals

Comparators

1. Individual, group, or family-based outpatient care (maximum two contacts per week) provided by specialist eating disorder health professionals

2. Individual or group outpatient care (maximum two contacts per week) provided by non-eating disorder specialist health professionals

3. Inpatient care from a specialist or a non-specialist eating disorder service for medical stabilisation that is time limited (maximum three weeks), and discharge before full weight restoration with planned outpatient follow-up

4. Waiting list, no active treatment, or treatment as usual for the eating disorder group

5. Partial hospital or day hospital care (more than two contacts per week and more than three hours per day, and includes clinician supervised meals)

As 1, 2, and 3 all include active outpatient psychotherapies, data were entered to allow for analyses of these as a grouped comparator, which we called active outpatient or combination brief hospital or outpatient care.

We did not include trials of treatment setting for medical or psychiatric complications or comorbidities (e.g. hypokalaemia, depression) of an eating disorder.

Types of outcome measures

Primary outcomes

1. Clinical improvement

a. For anorexia nervosa

Weight (body mass index (BMI) kg/m^2) as a proxy for physical health, corrected for age in adolescent and child samples, at end of treatment, when groups were not significantly different in mean weight or BMI at start of treatment

b. For bulimia nervosa, binge eating disorder, or other specified feeding or eating disorder (OSFED) bulimia nervosa or binge eating disorder of low frequency or limited duration (or both)

Frequency of binge eating (as defined in DSM-5 (APA 2013)).

c. For OSFED atypical anorexia nervosa, purging disorder, or unspecified eating disorder

Global eating disorder symptom score, measured by an eating disorder examination interview (Fairburn 1993), or questionnaire (Fairburn 1994).

2. Acceptability

We measured acceptability as the proportion of drop-outs. For this outcomes, we stratified the graph by the type of ED. We used treatment attrition as a proxy measure for treatment acceptability, acknowledging its limitations, and recognising that there are important other reasons for premature discontinuation, including perceived lack of efficacy and adverse effects.

Secondary outcomes

3. Clinical response

a. For anorexia nervosa

Weight restoration to within the normal weight range for participant sample (e.g. BMI, 19 to 25 for female young adults, or > 85% of that expected for age and height, or ≥ the fifth percentile for age and height)

b. For bulimia nervosa, binge eating disorder, or OSFED bulimia nervosa or binge eating disorder of low frequency or limited duration (or both)

Abstinence from binge eating (achieved or not achieved).

4. Recovery

a. For anorexia nervosa

Recovery according to an agreed published definition e.g. the Morgan 1975 narrow scale of a good outcome, namely, normal body weight (> 85% of average for age, gender, and height) with normal menstruation; or an intermediate outcome, namely, normal body weight (> 85% of average for age, gender, and height) with no menstruation; or the Morgan 1988 broader scale ratings (covering nutritional status, menstruation, mental state, psychosexual adjustment, and socioeconomic status) of intermediate or better outcome (Kordy 2002). In a treatment trial of anorexia nervosa, more than 50% participants achieving remission was considered efficacious (Costa 2016).

b. For bulimia nervosa, binge eating disorder, OSFED bulimia nervosa or binge eating disorder of low frequency or limited duration*(or both)*

Global eating disorder symptom score, measured by an eating disorder examination interview (Fairburn 1993), or questionnaire, within one standard deviation above the community mean (Fairburn 1994)

5. Quality of life score

Measured by any validated questionnaire, e.g. the Short Form-12 (Ware 1996), or eating disorder specific, e.g. the Engel quality of life instrument (Engel 2005)

6. Depression

Measured by any validated questionnaire for depression, e.g. the Beck Depression Inventory (Beck 1996)

6. General psychiatric symptoms

Measured by any validated questionnaire for general psychiatric symptoms, e.g. the Brief Symptom Inventory (Derogatis 1993)

8. Cost effectiveness

Measured by calculating incremental cost effectiveness ratios (ICER) – the additional costs of one intervention compared with another, divided by the additional effects of one intervention compared with another

9. Clinical improvement at one year following end of treatment, or two years since baseline

a. For anorexia nervosa

Weight (body mass index (BMI) kg/m^2) as a proxy for physical health, corrected for age in adolescent and child samples, at end of treatment, when groups were not significantly different in mean weight or BMI at start of treatment

b. For bulimia nervosa, binge eating disorder, OSFED bulimia nervosa or binge eating disorder of low frequency or limited duration (or both)

Frequency of binge eating (as defined in DSM-5 (APA 2013))

c. For specified atypical anorexia nervosa, purging disorder, or unspecified eating disorder

Global eating disorder symptom score, measured by an eating disorder examination interview (Fairburn 1993), or questionnaire (Fairburn 1994)

Notes:

1. In Outcome 9 - If therapy lasted for one year, two years since baseline was equal to one year following end of treatment, but if there was no treatment, or therapy was less than one year duration, we set follow-up at two years from baseline to compare this outcome over comparable time frames.

2. When outcomes were combined across eating disorders (e.g. bulimia nervosa, binge eating disorder, OSFED bulimia nervosa or binge eating disorder type; or OSFED atypical anorexia nervosa, OSFED purging disorder or unspecified feeding or eating disorder), graphs were stratified by type of ED.

Search methods for identification of studies

Cochrane Common Mental Disorders Controlled Trials Register (CCMD-CTR)

The Cochrane Common Mental Disorders Group maintains a specialised register of randomised controlled trials, the CCMDCTR. This register contains over 40,000 reference records (reports of RCTs) for anxiety disorders, depression, bipolar disorder, eating disorders, self-harm, and other mental disorders within the scope of this Group. The CCMDCTR is a partially study-based register, with > 50% of reference records tagged to approximately 12,500 individually PICO-coded study records. Reports of trials for inclusion in the register are collated from (weekly) generic searches of MEDLINE (from 1950), Embase (from 1974), and PsycINFO (from 1967), quarterly searches of the Cochrane Central Register of Controlled Trials (CENTRAL), and review specific searches of additional databases. Reports of trials are also sourced from international trial registries, drug companies, the handsearching of key journals, conference proceedings, and other (non-Cochrane) systematic reviews and meta-analyses. Details of CCMD's core search strategies (used to identify RCTs) can be found on the Group's website, with an example of the core MEDLINE search displayed in Appendix 1.

The CCMDCTR is current to June 2016.

Electronic searches

1. Cochrane Common Mental Disorders Group's Specialised Register (CCMD-CTR)

- The Group's Information Specialist (IS) searched the CCMD-CTR Studies Register on condition alone ('anorexia nervosa' or 'bulimia' or 'eating disorder*'), and records were screened to identify relevant studies.

- The Group's IS searched the CCMD-CTR References Register for additional untagged and uncoded records, using a more sensitive set of free-text terms, focusing on the treatment setting: (anorexi* or bulimi* or "eating disorder*" or EDNOS) and (setting or inpatient* or in-patient* or outpatient* or out-patient* or hospital* or admission* or confinement or clinic or clinics or "clincal management" or "clinical support" or specialist or "specialized treatment" or "specialised treatment" or supervi* or "day care" or "day centre*" or "day center*" or "day unit*" or "day treatment*" or "community mental health" or "mental health service*" or residential or referral or referred or "patient care" or (weight and restor*) or feed* or re-feed* or refeed*)

The initial search date was 7 April 2014, which was updated in the CCMD-CTR on 20 November 2015.

2. Databases

The IS conducted a further search on 2 July 2018. Since the CCMD-CTR was out of date at this time, the IS searched the following databases, using subject headings, keywords, and search syntax appropriate to each resource (Appendix 2):

- Cochrane Central Register of Controlled Trials (CENTRAL 2018, Issue 6) in the Cochrane Library (date limited, 2015 to 3 July 2018;
- MEDLINE Ovid (2015 to 2 July 2018);
- Embase Ovid (2015 to 2 July 2018);
- PsycINFO Ovid (2015 to 2 July 2018).

3. International Trial Registers

We searched the WHO International Clinical Trials Registry Platform (ICTRP) and ClinicalTrials.gov (condition alone; "anorexia nervosa" or bulimia or "eating disorder*") on 7 April2014, 20 November 2015, and 6 July 2018. We screened records for relevant unpublished or ongoing studies (or both).

Searching other resources

We inspected the reference lists of all included papers, and any systematic reviews identified from the search above for further relevant studies.

We conducted a citation search on the Web of Science to identify additional reports citing any of the included studies.

Data collection and analysis

Selection of studies

We evaluated all records according to the inclusion criteria listed above. Two review authors (PH and SM) independently selected studies, based on the inspection of abstracts (PH, SM), and by reading the full articles (PH, SM). If the abstract indicated that it was a trial of treatment settings for eating disorders, PH and SM independently reviewed the full article to determine, first, if the trial was randomised, and second, if it was a trial of treatment settings for eating disorders, and therefore met the inclusion criteria. Authors reached consensus through discussion at each stage of selection.

We had planned translations of non-English texts, but they were not needed.

Data extraction and management

We analysed trials of weight restoration in anorexia nervosa separately from those of other eating disorders. We stratified trials of other eating disorders by diagnosis (bulimia nervosa, binge eating disorder, other eating disorder) in the analyses. We extracted and recorded data according to DSM-5 criteria (APA 2013) (e.g., trials of DSM-IV (APA 2000) anorexia nervosa and anorexia nervosa EDNOS type where all participants were underweight and thus met criteria for DSM-5 were treated as trials of DSM-5 anorexia nervosa and trials of DSM-IV bulimia nervosa and EDNOS where participants' binge eating frequency mets DSM-5 criteria for bulimia nervosa and thus also met criteria for DSM-5 bulimia nervosa were treated as trials of bulimia nervosa).

We did not conceal trial authorship at the point of data collection. Two review authors (PH, SM) independently extracted data, including the country or specific cultural aspects of the treatment setting, or both. A third author (ST) adjudicated where there were discrepancies. Data on features of each trial, quality appraisal, interventions, and outcomes were extracted according to a pre-designed data extraction form (see Appendix 3). Agreed data were entered into a spreadsheet programme, and into the Review Manager 5 software programme (RevMan 2014).

Assessment of risk of bias in included studies

For each included study, two review authors (PH, SM) independently assessed risk of bias, using the Cochrane tool. They reached consensus on decisions, and consulted with a third review author (ST) for unresolved differences.

We allocated one of three possible categories for each source of potential bias for each of the included studies: 'low risk of bias', 'high risk of bias', or 'unclear risk of bias'.

1. Adequate method of sequence generation

Low: appropriate method of randomisation used
Unclear: method of randomisation not described
High: randomised method described but not randomised (e.g. every alternate patient given the control treatment)

2. Adequacy of allocation sequence concealment (allocation concealment)

Low: indicates adequate concealment
Unclear: indicates uncertainty about whether allocation was adequately concealed
High: indicates the allocation was definitely not adequately concealed

3. Blinding of participants, personnel and blinding of the outcome assessor(s)

Low: blinding of outcome assessor(s) and personnel and blinding of participant (double-blind) (Each assessed independently)
Unclear: blinding of outcome assessor(s) only (single-blind)
High: blinding not done

4. Incomplete outcome data (attrition bias)

Low risk: attrition: < 20%
High risk: attrition: ≥ 20%

5. Selective outcome reporting

Low: complete outcomes reported in analyses, determined by available protocol or trial register, or all important outcomes listed in methods and reported in results
Unclear: mix of completers, subset, and full data reported
High: outcomes reported on subset (e.g. only those participants who were treated according to protocol) or other selective outcome reporting (e.g. selective omission of outcomes from reports)

6. Other sources of bias

The comparability of groups after randomisation with regards to the following putative demographic and illness severity confounding factors: age, gender, body weight, severity of illness at study inception (using measures applied at outcome assessment).

Low: groups comparable at baseline on demographics and illness severity
Unclear: uncertain, comparability not assessed
High: groups not comparable at baseline

Although imbalance may occur by chance, it may also occur when there is inadequate randomisation (or exclusion of participants after randomisation), or inadequate allocation concealment, and it is thus relevant when assessing bias, for group comparability to be assessed and reported (Higgins 2011, section 8.14.1.2).

Measures of treatment effect

We calculated risk ratios for dichotomous outcomes, and mean differences or standardised mean differences for continuous outcomes, together with 95% confidence intervals. We used standardised mean differences when different outcome measures were applied across trials. We chose risk ratio as it is less likely to overestimate a treatment effect (Higgins 2011, section 9.2.2.3).

Unit of analysis issues

Cluster-randomised trials

Had we found cluster-randomised trials, we had planned to proceed according to the *Cochrane Handbook of Systematic Reviews of Interventions* (Higgins 2011, section 16.3.3), i.e. to extract a direct estimate of the required effect measure from an analysis that properly accounted for the cluster design (according to statistical advice of author SL). We would then have meta-analysed effect estimates and their standard errors from correct analyses of cluster-randomised trials, using the generic inverse-variance method in Review Manager 5.

Cross-over trials

Had we found cross-over trials, we had planned to follow the procedure according to the *Cochrane Handbook of Systematic Reviews of Interventions* (Higgins 2011, section 16.4.4). If we did not consider carry-over or period effects to be a problem, we would have analysed continuous data from a two-period, two-intervention cross-over trial with a paired t-test. This would have evaluated the value of the measurement of the experimental intervention minus the measurement of the control intervention separately for each participant. We would have calculated the effect estimate in a meta-analysis, using the generic inverse-variance method in Review Manager 5.

Studies with multiple treatment groups

When we found trials with multiple intervention groups, we followed the procedure recommended by the *Cochrane Handbook of Systematic Reviews of Interventions* (Higgins 2011, section 16.5.4). First, we determined which intervention groups were relevant to this systematic review, and second, we determined which intervention groups were relevant to a particular pair-wise comparison in the meta-analysis. We described all intervention groups of a multi-intervention trial in the table of 'Characteristics of included studies'. We described the interventions relevant to this review, and thus those we would potentially use in the analyses, in detail.

In planning the review, we considered three options: (i) if more than two intervention groups were relevant, we would consider combining groups to create a single pair-wise comparison (e.g. if a trial had one inpatient condition and two outpatient conditions, we planned to combine the two outpatient conditions if appropriate), (ii) if this was not possible, we would determine if it was possible to split the shared group (often the control group) into two or more smaller sample sizes, to conduct two or more (reasonably independent) comparisons, and, (ii) if this was not possible, we had planned to select one pair of interventions and excluded the others. We used the second option in this review.

Dealing with missing data

We contacted authors to provide information not available in the published study, including information needed for data analyses (such as the standard deviation), subgroup and sensitivity analyses, and evaluation of risk of bias, and to obtain the results of unpublished or partly published trials (Higgins 2011, section 7.7). We asked authors to respond within three months of the request; if they did not respond within the time allotted, we repeated the request once.

Where authors responded, we recorded this, and the information supplied, in the 'Characteristics of included studies' and 'Risk of bias' tables.

When there were missing statistics, we sought them from authors, or calculated them using methods and data available to us (e.g. used existing confidence intervals, standard errors, t values, or P values to calculate standard deviations). As we expected to find only a few trials, we sought statistical advice on imputation, and only attempted it if the majority of trials in the meta-analysis had completed statistics (Higgins 2011, section 16.2.3.1).

We only planned to impute data for categorical outcome variables when weight restoration, binging, or purging abstinence were unavailable. In these instances, we assumed that if there was no follow-up information, the participant(s) concerned did not attain normal weight for age and height, or did not achieve abstinence from binging or purging.

For continuous data, we only included data for known results. We had planned to consider the potential impact of the missing data to inform the interpretation of the results, i.e. the pooled estimate of the treatment effect, and the variability of the outcomes.

Assessment of heterogeneity

We assessed heterogeneity with the Chi^2 test ($P < 0.10$) and the observed value of the I^2. The observed value of I^2 depends on (i)

magnitude and direction of effects and (ii) strength of evidence for heterogeneity (e.g. P value from the Chi^2 test, or a confidence interval for I^2). However, interpretation of I^2 can be misleading, since the importance of inconsistency depends on several factors. Higgins 2011 has provided a rough guide to interpretation, with overlapping bands as follows:

- 0% to 40%: might not be important;
- 30% to 60%: may represent moderate heterogeneity;
- 50% to 90%: may represent substantial heterogeneity;
- 75% to 100%: considerable heterogeneity.

If the I^2 value was moderate to high, and the direction and magnitude of the treatment effect suggested important heterogeneity, we would have investigated the putative source of the heterogeneity with subgroup and sensitivity analyses (Higgins 2011).

Assessment of reporting biases

In meta-analyses of 10 or more trials, we had planned to investigate systematic differences between reported and unreported findings by developing and inspecting funnel plots, and conducting statistical tests for funnel plot asymmetry for primary continuous outcome variable(s). However, it is acknowledged that an asymmetrical funnel plot is not necessarily indicative of publication bias, and that publication bias does not necessarily cause asymmetry.

We attempted to minimise putative duplicate publication bias by checking with authors for suspected duplicate publication. We attempted to minimise location, language, and citation bias by broad, comprehensive, and systematic searches that included non-English reports of trials.

Data synthesis

We used a fixed-effect meta-analysis for this review, as the number of studies included in this review was too small for a random-effects model, and thus the parameter estimates (in particular, the estimate of Tau^2) would likely have been imprecise (see Borenstein 2007and Differences between protocol and review).

Subgroup analysis and investigation of heterogeneity

We had planned to combine data for all eating disorders in a single meta-analysis for the same outcome from the same comparison. We had planned to conduct the following subgroup analyses if appropriate:

1. Diagnostic subgroups of DSM-5 bulimia nervosa, binge eating disorder, and other specified or unspecified eating disorders (APA 2013)
2. Adolescents compared to adults, i.e. < 18 years old and > 18 years old
3. Family-based inpatient programmes and non-family-based inpatient programmes
4. Cognitive behaviour therapy versus other individual psychotherapies

We planned to address identified heterogeneity by first checking that the data were correct; If data were correct and there was a large degree of inconsistency in the results, we planned to conduct a sensitivity analysis, by sequentially removing trials by sample size, starting with the smallest, until there were only three trials, or heterogeneity was reduced to non-significance (P ≥ 0.1).

Sensitivity analysis

We had planned these sensitivity analyses:

(i) remove trials with attrition rates > 50%;
(ii) remove trials where care was not multi-disciplinary across all intervention groups;
(iii) remove unblinded trials where the participants were not blind to group;
(iv) remove trials where the outcome assessor(s) was/were not blind to group.

If there was a large amount of missing continuous data, we would have performed a sensitivity analysis using the method described in Higgins 2011, section 16.2.3, which would assume a fixed difference between the actual mean for the missing data and the mean assumed by the analysis.

'Summary of Findings' Tables

We developed 'Summary of findings' tables to summarise the key findings of the review, for the populations of participants with anorexia nervosa treated in a specialty setting. We tabulated the comparisons between specialist inpatient care and outpatient or limited inpatient care, followed by care provided outside the hospital, in terms of the effects on participant outcomes of weight (or BMI) and acceptability (treatment dropout) at the end of 12 months. We included the most relevant (primary) outcomes in the 'Summary of findings' table. We used the GRADE criteria (Higgins 2011) to assess the body of evidence for each comparison: study limitations, inconsistencies of intervention components and results across studies, indirectness of evidence, imprecision (few participants or events, wide confidence intervals), and publication bias.

RESULTS

Description of studies

Results of the search

The database searches resulted in 3280 reports after duplicates were removed. Searching other sources added no articles. We identified 71 abstracts as potentially relevant; after full-text review, we identified a total of five studies that met all eligibility criteria were included in the review (see Figure 1 for details).

Figure 1. Study flow diagram

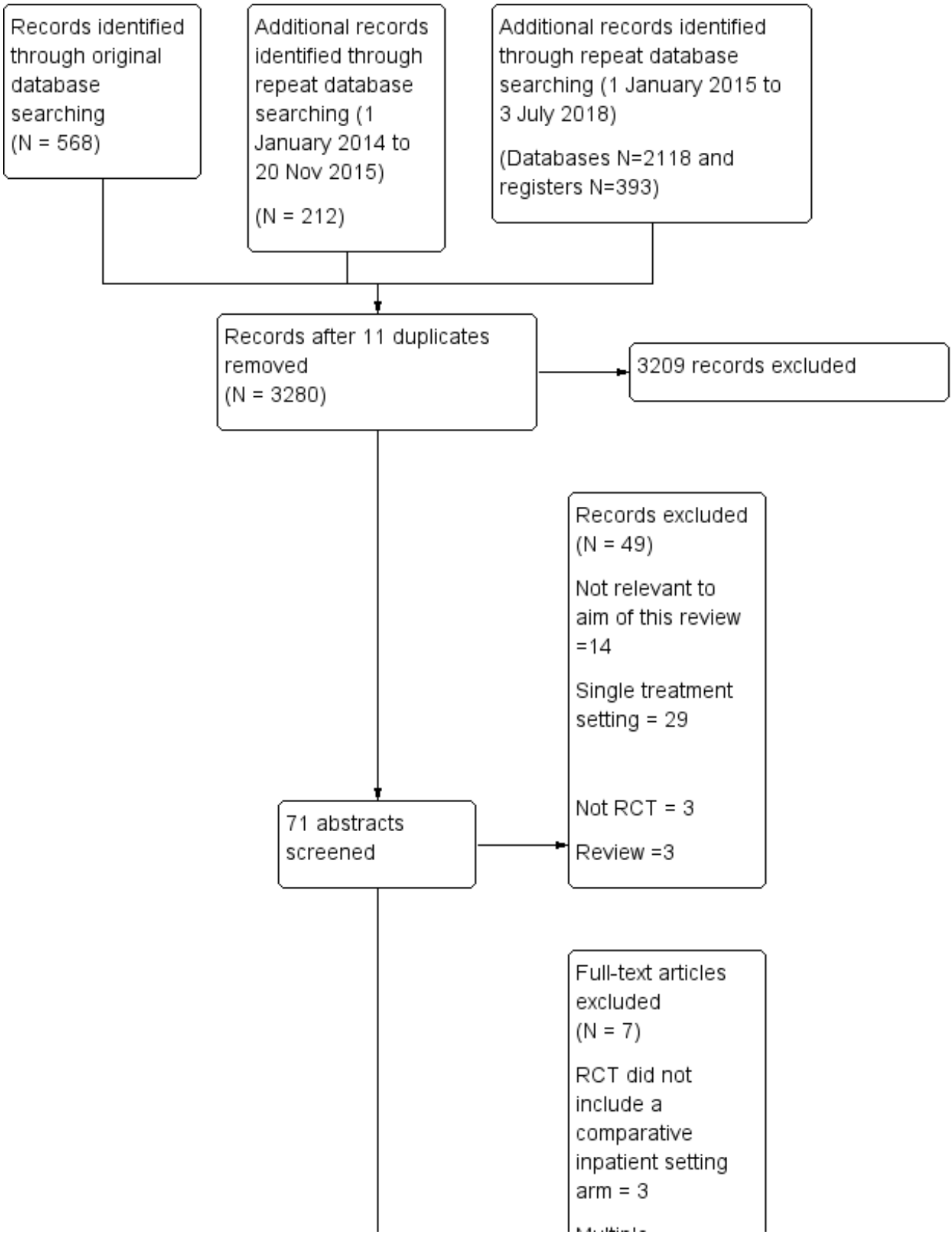
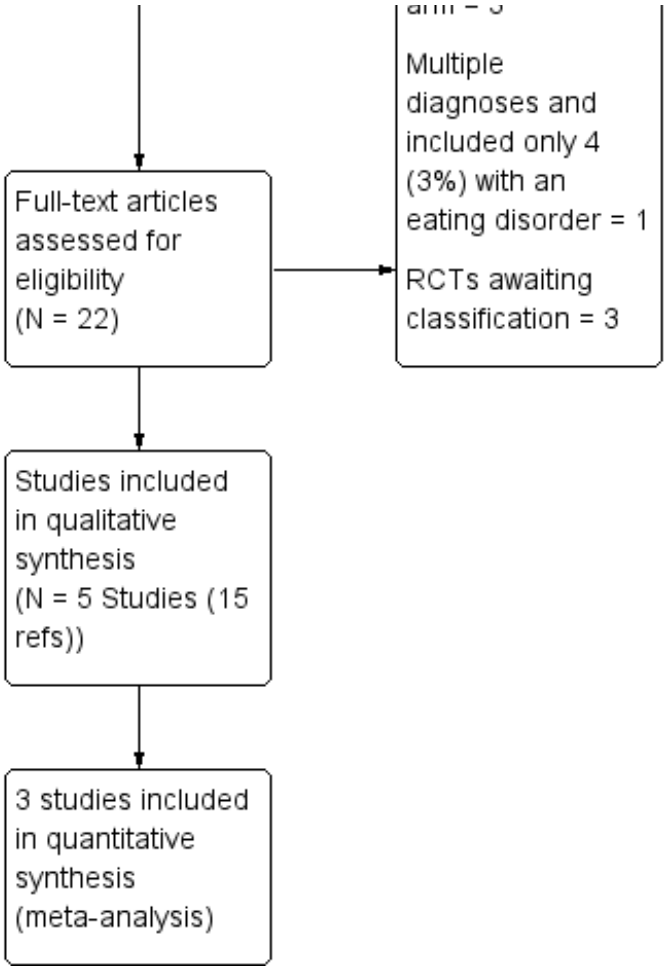


Figure 1. (Continued)



On abstract inspection we excluded 14 studies as they were descriptions of study protocols not relevant to this review. We excluded a further 29 studies because they described treatment interventions in a single treatment setting, either inpatient (N = 8) or outpatient (N = 21), or were not randomised controlled trials (RCT; N = 3). We also excluded 3 review articles. On inspection of full texts we excluded four ineligible studies (see Characteristics of excluded studies) and three published protocols that were completed and potentially eligible, but data were not available, so that are awaiting classification (ISRCTN11275465; NCT00184301; NCT00815815; see Excluded studies). We identified a total of 15 references related to the 5 included studies.

Of these five included studies, four were of participants with anorexia nervosa (N = 511), two compared inpatient treatment to outpatient treatment (Crisp 1991; Gowers 2010), one compared different lengths of inpatient treatment (Madden 2014), and one compared inpatient treatment to partial hospitalisation (Herpertz-Dahlmann 2014). One trial was of 55 participants with bulimia nervosa (Zeeck 2009). See Characteristics of included studies.

Included studies

Design

All included studies used a randomised controlled parallel groups design. We identified no eligible cluster-randomised or cross-over trials.

Sample sizes

Sample sizes ranged from 82 (Madden 2014), to 172 (Herpertz-Dahlmann 2014).

Setting

Trials were based in the United Kingdom (Crisp 1991; Gowers 2010), Germany (Herpertz-Dahlmann 2014; Zeeck 2009), and Australia (Madden 2014).

Participants

The studies of anorexia nervosa had broadly similar inclusion and exclusion criteria. Three included adolescents aged 12 years to 18 years (Gowers 2010; Herpertz-Dahlmann 2014; Madden 2014); one included adults (Crisp 1991).

All included participants met criteria for anorexia nervosa according to DSM-III-R (APA 1987), or DSM-IV (APA 2000).

Two studies further defined illness duration (less than 10 years (Crisp 1991), less than 3 years (Madden 2014)); participants in the Herpertz-Dahlmann 2014 trial were all in their first hospital presentation.

The participants in the Zeeck 2009 trial were adults with bulimia nervosa, according to DSM-IV (APA 2000), or ICD-10 (WHO 1992) criteria, who had failed to improve in outpatient psychotherapy with a minimum of 25 sessions in the preceding two years, had severe symptoms that were inappropriate for outpatient care, had been diagnosed for a minimum of five years, and had severe comorbidity.

Interventions

All trials compared treatment in an alternate setting to a specialist eating disorder inpatient programme. Comparator settings in the anorexia nervosa trials were (i) outpatient individual and family psychotherapy from experienced eating disorder therapists – four sessions of dietary counselling, (ii) 10 monthly outpatient group psychotherapy sessions (patient and parents) from experienced eating disorder therapists – four sessions of dietary counselling or a single assessment (Crisp 1991), (iii) outpatient specialised therapy – cognitive behaviour therapy (CBT) and family counselling from eating disorder therapists, or (iv) generic (non-eating disorder specialist) outpatient care (Gowers 2010) – short (three weeks) inpatient admission, followed by day hospital treatment based on weight restoration; both treatment arms included nutritional counselling, CBT, and family therapy from an eating disorder specialist treatment service (Herpertz-Dahlmann 2014); a three-week inpatient admission for weight restoration followed by 20 sessions of outpatient family-based treatment in an eating disorder specialist treatment service (Madden 2014). In two trials, participants were inpatients until weight was restored (Herpertz-Dahlmann 2014; Madden 2014). The Zeeck 2009 trial compared inpatient and a partial hospitalisation12-week programme in an eating disorder specialist treatment service. Both programmes comprised up to eight regular weekly group or individual therapy sessions, a weekly medical appointment with the doctor, and other family therapy, or individual sessions with a social worker, on an as-needed basis, Medication was prescribed as needed. The partial hospital care was provided five days a week, over an eight-hour day.

Primary outcomes

Note: Studies of anorexia nervosa reported main outcomes at one year after baseline.

All included studies reported both primary outcomes of weight, BMI, or frequency of binge eating, and numbers completing treatment. One study did not provide outcomes at the end of treatment, but one year following the initial assessment, regardless of when treatment finished; treatment finished at different points in the 12 months following baseline (Crisp 1991).

Secondary outcomes

Clinical response

a. For anorexia nervosa

Two trials reported these data (Herpertz-Dahlmann 2014; Madden 2014)

b. For bulimia nervosa, binge eating disorder, OSFED bulimia nervosa and binge eating disorder type

We received unpublished binge eating abstinence data from the authors (Zeeck 2009).

Recovery

a. For anorexia nervosa

Three studies reported recovery according to an agreed published definition (Gowers 2010; Herpertz-Dahlmann 2014; Madden 2014).

b. For bulimia nervosa, binge eating disorder, specified bulimia nervosa and binge eating disorder of low frequency or limited duration (or both)

Zeeck 2009 did not use the eating disorder examination interview (Fairburn 1993), or the questionnaire (Fairburn 1994), so we could not report on this outcome.

Quality of life score

No trials included a quality of life measure.

Depression, other psychiatric symptoms

All trials measured these outcomes. They used either the mental state item on the Morgan-Russell outcome assessment schedule (Crisp 1991; Gowers 2010), the Brief Symptom Inventory (Herpertz-Dahlmann 2014; Zeeck 2009), or the revised Child Anxiety and Depression Scale (Madden 2014).

Cost effectiveness

Two trials examined cost-effectiveness (Gowers 2010; Herpertz-Dahlmann 2014).

Primary outcomes at one-year follow-up

Four trials followed participants for at least one year (Crisp 1991; Gowers 2010; Madden 2014; Zeeck 2009). Crisp 1991 only reported on a subset of participants in the outpatient or waiting list groups)

Excluded studies

On inspection of full texts we excluded one study that comprised a sample with insufficient numbers of participants with an eating disorder (Boege 2015) and three studies that did not report a direct comparison with an inpatient setting (N = 3; Castelnuovo 2011; Eisler I; Kong 2005; see Characteristics of excluded studies).

Ongoing studies

We did not identify any ongoing studies.

Studies awaiting classification

Three trials await classification.

ISRCTN11275465 is a three-armed randomised controlled trial in adolescents with anorexia nervosa. Three treatment settings are compared: inpatient care, outpatient family therapy, and Multiple-Family Day Treatment (MFDT). The trial is complete, unpublished, and results are not currently available.

NCT00184301 is a two-armed randomised controlled trial in adults with anorexia nervosa, or bulimia nervosa and a personality disorder. Two treatment settings are compared: behavioural inpatient treatment lasting one year versus behavioural intensive

outpatient treatment, consisting of twice-weekly group sessions over one year.The trial is complete, unpublished, and results are not currently available.

NCT00815815 is a two-armed randomised controlled trial in participants with anorexia nervosa. Two treatment settings are compared: continued inpatient treatment – participants undergo inpatient hospital treatment until they have gained enough weight to be discharged verus sequenced treatment, where participants begin with inpatient treatment, transition to day hospital treatment, and then transition to outpatient treatment. Both are a structured behavioral treatment. There are daily therapy sessions and a weight gain protocol involving set meals and exercise levels.The trial is complete, unpublished, and results are not currently available.

See Characteristics of studies awaiting classification.

Risk of bias in included studies

See Figure 2 and Figure 3

Figure 2. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies

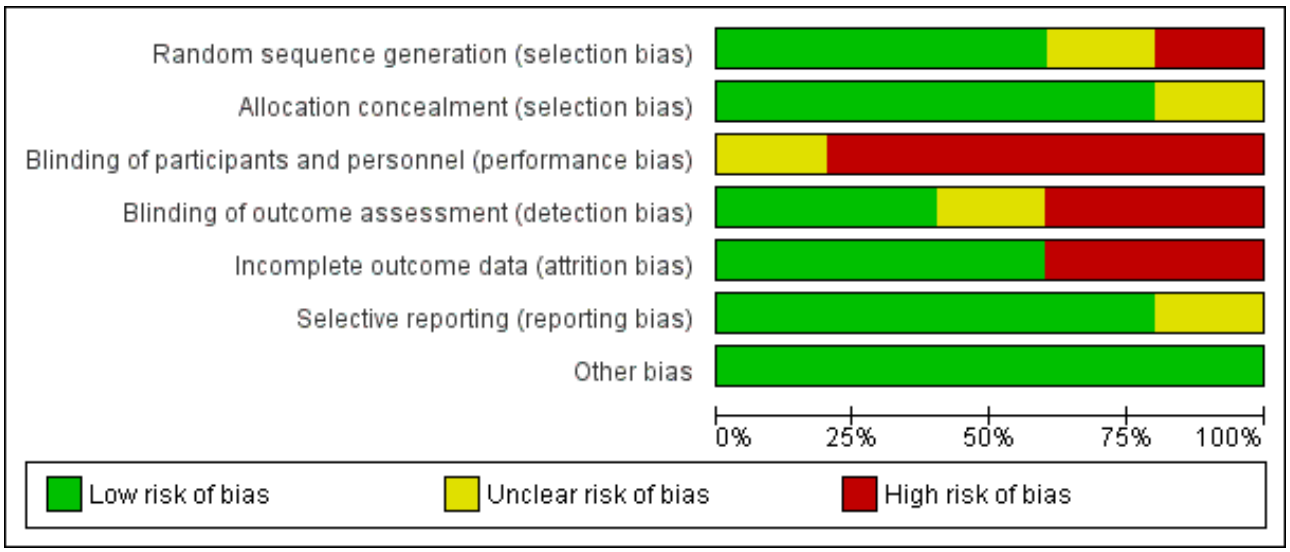
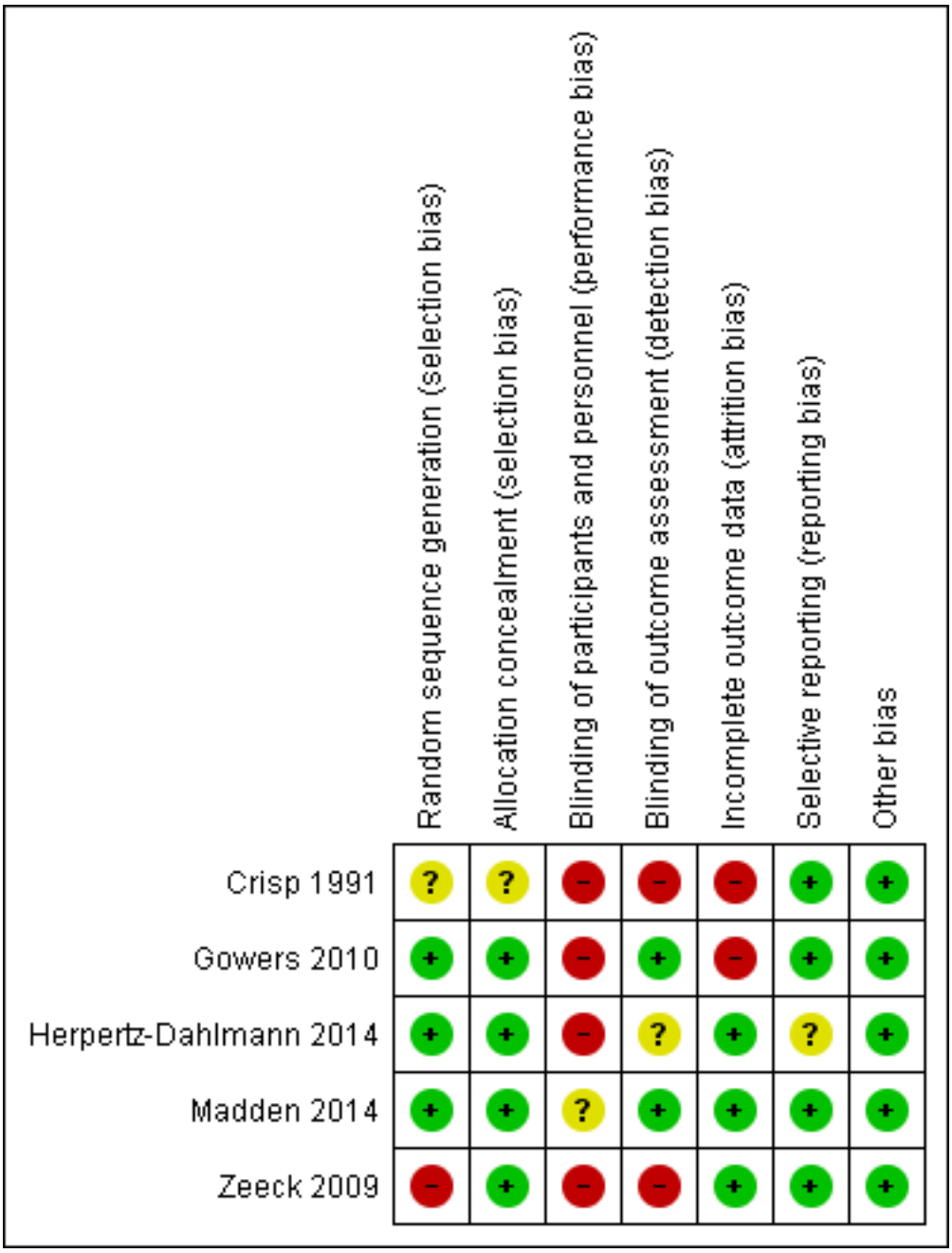


Figure 3. Risk of bias summary: review authors' judgements about each risk of bias item for each included study



Allocation

One trial had an unclear method of randomisation and allocation concealment (Crisp 1991). All other trials had adequate methods of randomisation and allocation concealment.

Blinding

Four trials had no blinding of outcome assessors, participants, or care providers and were at high risk of bias. One trial had an unclear risk, as the participants and care providers were not blind to the intervention group, but the outcome assessor was blind to the group (Madden 2014).

Incomplete outcome data

One trial was at high risk due to high attrition (Crisp 1991). One trial had high risk with 35% treatment attrition (Gowers 2010). Three trials were low risk (Herpertz-Dahlmann 2014; Madden 2014; Zeeck 2009).

Selective reporting

All trials were at low risk of reporting bias except Herpertz-Dahlmann 2014, where 15% of participants were not included in outcome analyses and risk was rated unclear.

Other potential sources of bias

We did not identify any other potential sources of bias. All trials had comparable groups at baseline.

Effects of interventions

See: **Summary of findings for the main comparison** Summary of findings: Specialist inpatient care for weight restoration compared with active outpatient or combination brief hospital/outpatient care

See Summary of findings for the main comparison for the primary outcomes for comparison 1.

We planned four comparisons. Due to the small number of studies and heterogeneity of interventions between papers, it was only possible to conduct a meta-analysis for the first comparison, namely, Inpatient care for weight restoration in anorexia nervosa, provided by a specialist eating disorder service and health professionals versus active outpatient or combination of brief hospital and outpatient care. We reported narrative findings for the second comparison (inpatient care for weight restoration in anorexia nervosa provided by a specialist eating disorder service and health professionals versus waiting list or no active treatment), which only had data for one secondary outcome (general psychological symptoms) from one trial. We reported narrative findings for the third and fourth comparisons where there were data from single trials for primary and some secondary outcomes.

Comparison 1: Inpatient care for weight restoration in anorexia nervosa provided by a specialist eating disorder service and health professionals versus active outpatient, or combined brief hospital and outpatient care

Primary outcomes

1.1 Weight or BMI at end of treatment in participants with anorexia nervosa

Two trials of 232 participants contributed to this comparison (Gowers 2010; Madden 2014). There was no clear difference between settings for weight gain (standardised mean difference (SMD) -0.22, 95% confidence interval (CI) -0.49 to 0.05; 1 RCT, 78 participants; Analysis 1.1).

1.2 Acceptability: number of participants who completed treatment

Three trials of 319 participants contributed to this outcome (Crisp 1991; Gowers 2010; Madden 2014). Significantly more participants completed treatment in the outpatient setting than in the inpatient setting (risk ratio (RR) 0.75, 95% CI 0.64 to 0.88; 2 RCTs, 154 participants; Analysis 1.2).

Secondary outcomes

1.3 Clinical response: weight restoration to within normal range at end of treatment

One trial contributed data for this comparison (Madden 2014). We found no clear difference between settings in the proportion of participants who achieved weight restoration (19/41 versus 18/41; RR 1.06, 95% CI 0.65 to 1.70; 1 RCT, 69 participants; Analysis 1.3) i.e. weight to normal range reported as ≥ 10th percentile.

1.4 Recovery: a level of intermediate or better on the Morgan-Russell outcome assessment schedule

Two trials of 234 participants measured this outcome (Gowers 2010; Madden 2014). There was no significant difference between settings (49/88 versus 89/146; RR 0.93, 95% CI 0.73 to 1.17; 2 RCTs, 234 participants; Analysis 1.4). Remission in Madden 2014 did not measure remission with the Morgan-Russell outcome assessment schedule, so we used 95% of expected body weight as a measure of recovery.

1.5 Mental health-related quality of life

None of the trials measured this outcome.

1.6 Depression: severity

Two trials of 196 participants measured this outcome (Gowers 2010; Madden 2014). There was no significant difference in symptom severity between settings (SMD -0.20 95% CI -0.49 to 0.10; 2 RCTs, 196 participants; Analysis 1.5).

1.7 General psychiatric symptoms: severity

Two trials of 227 participants measured this outcome (Crisp 1991;Gowers 2010). There was no significance difference in symptom severity between settings (mean difference (MD) -0.17, 95% CI -1.04 to 0.69; 2 RCTs, 223 participants; Analysis 1.6).

1.8 Total cost of care to end of treatment

Two trials reported on costs of care in the RCT, but there were no useable data for a meta-analysis (Gowers 2010; Madden 2014).

Gowers 2010 reported on cost-effectiveness over two years since baseline based on service use during this time period. The greatest service use was in the group randomised to non-eating disorder specialist outpatient care, mostly because of a higher readmission rate. With this analysis, the mean cost per participant was GBP 26,797 for the specialist outpatient group, GBP 34,371 for the inpatient group, and GBP 40,520 for the non-specialist outpatient group. On a cost-effective acceptability analysis of 'willingness to pay nothing for a unit increase' on the Morgan-Russell average outcome assessment schedule (the primary outcome in this RCT), there was an 80% probability that specialist outpatient services were the most cost-effective, followed by inpatient (16% probability), and non-specialist outpatient (6%). At five-year follow-up, there were no significant differences in the cost of health service use between randomised groups. It was noted that participants in both the inpatient and non-specialist outpatient groups were more likely to use private (i.e. more expensive) facilities. On multiple regression conducted by the authors (Gowers 2010), the strongest baseline predictor of total cost was severity of weight loss, however, the model accounted for only 10% of the variance.

Madden 2014 did not undertake a formal cost-effectiveness analysis. They calculated a cost saving of USD 25,000 per participant in the time-limited inpatient group, compared to the inpatient group where participants remained in hospital until weight was restored. This was based on the local estimated cost per day in hospital. They noted this would increase in other jurisdictions, such as those in the USA, because of greater local costs. They did not calculate total cost of care.

1.9 Weight or BMI at one year following end of treatment or two years since baseline

One trial measured this outcome at two years after baseline (Gowers 2010). Participants in the non-specialist outpatient care group achieved a higher mean weight compared to those in the inpatient or specialist outpatient groups, but differences were small and not significant (MD -3.72 kg, 95% CI -8.96 to 1.52; 1 RCT, 101 participants; Analysis 1.7).

Comparison 2: Inpatient care for weight restoration in anorexia nervosa provided by a specialist eating disorder service and health professionals versus waiting list, no active treatment, or treatment as usual

Primary outcomes

2.1 Weight or BMI at end of treatment in participants with anorexia nervosa

None of the RCTs measured this outcome.

2.2 Acceptability: number of participants who completed treatment

This outcome was not applicable to this comparison.

Secondary outcomes

2.3 Clinical response: weight restoration to within normal range at end of treatment

None of the RCTs measured this outcome.

2.4 Recovery: a level of intermediate or better on the Morgan-Russell outcome assessment schedule

None of the RCTs measured this outcome.

2.5 Mental health-related quality of life

None of the RCTs measured this outcome.

2.6 Depression

None of the RCTs measured this outcome.

2.7 General psychiatric symptoms: severity

One trial measured this outcome (Crisp 1991). There was little difference between mean Morgan-Russell outcome assessment schedule mental state scores between those who received specialist inpatient care and those who received a single assessment session with no further contact (MD 0.60, 95% CI -1.74 to 2.94; 1 RCT, 50 participants; Analysis 2.1).

2.8 Total cost of care to end of treatment

None of the RCTs measured this outcome.

2.9 Weight or BMI one year following end of treatment or two years since baseline

None of the RCTs measured this outcome.

Comparison 3: Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care

Primary outcomes

3.1 Weight or BMI at end of treatment in participants with anorexia nervosa

One trial measured this outcome (Herpertz-Dahlmann 2014). Those who received partial hospital care gained more weight than those who were treated as inpatients, but the difference was small and not significant (MD -0.30 of a BMI point, 95% CI -0.87 to 0.27; 1 RCT, 161 participants; Analysis 3.1).

3.2 Acceptability: number of participants who completed treatment

One trial measured this outcome (Herpertz-Dahlmann 2014). There were no clear differences between settings, 85/85 (100%) completed inpatient care and 81/87 (93%) completed partial hospitalisation care (RR 1.07, 95% CI 1.01 to 1.14; 1 RCT, 172 participants; Analysis 3.2).

Secondary outcomes

3.3 Clinical response: weight restoration to within normal range at end of treatment

One trial measured this outcome as weight equal to or greater than the tenth percentile (Herpertz-Dahlmann 2014). There was no clear difference between settings (RR 0.99, 95% CI 0.85 to 1.16; 1 RCT, 172 participants; Analysis 3.3)

3.4 Recovery: a level of intermediate or better on the Morgan-Russell outcome assessment schedule

One trial measured this outcome (Herpertz-Dahlmann 2014). There was no clear difference between settings (RR 0.96, 95% CI 0.66 to 1.40; 1 RCT, 167 participants; Analysis 3.4).

3.5 Mental health-related quality of life

None of the RCTs measured this outcome.

3.6 Depression

None of the RCTs measured this outcome.

3.7 General psychiatric symptoms: incidence

One trial measured this outcome (Herpertz-Dahlmann 2014). Those who received inpatient care reported fewer psychiatric symptoms, measured on the General Psychiatric Symptom inventory, than those who received partial hospital care (MD -2.10, 95% CI -3.05 to -1.15; 1 RCT, 140 participants; Analysis 3.5).

3.8 Total cost of care to end of treatment

One trial measured this outcome (Herpertz-Dahlmann 2014). Costs were lower for partial hospital care than for inpatient care (MD 8.37 economic units, 95% CI 3.52 to 13.21 units; 1 RCT, 172 participants; Analysis 3.6)

3.9 Weight or BMI one year following end of treatment or two years since baseline=

None of the RCTs measured this outcome.

Comparison 4: Specialist inpatient care for bulimia nervosa, binge eating disorder, and other specified feeding or eating

disorder (OSFED) bulimia nervosa or binge eating disorder type versus partial hospital care

Primary outcomes

4.1 Binge eating: frequency

One trial measured this outcome (Zeeck 2009). There was no clear difference in the frequency of binge eating between settings (MD -0.45, 95% CI -1.04 to 0.14; 1 RCT, 43 participants; Analysis 4.1). At three-year follow-up, those in the partial hospital care group had improved and those in the inpatient care group had worsened, but differences were still not significant.

4.2 Acceptability: number of participants who completed treatment

One trial measured this outcome (Zeeck 2009). There was no clear difference between settings (18/27 versus 18/28; RR 1.04, 95% CI 0.71 to 1.52; 1 RCT, 55 participants; Analysis 4.2).

Secondary outcomes

4.3 Clinical response: binge eating: abstinence

One trial measured this outcome (Zeeck 2009). There was no clear difference between settings (7/21 inpatient versus 3/22 partial care; RR 2.44, 95% CI 0.73 to 8.22; 1 RCT, 43 participants; Analysis 4.3).

4.4 Recovery: a level of less than 1 SD above the mean global Eating Disorder Examination score

None of the RCTs measured this outcome.

4.5 Mental health-related quality of life

None of the RCTs measured this outcome.

4.6 Depression

None of the RCTs measured this outcome.

4.7 General psychiatric symptoms: severity

One trial measured this outcome (Zeeck 2009). There was no clear difference in symptom severity between settings (MD 0.20, 95% CI -0.08 to 0.48; 1 RCT, 43 participants; Analysis 4.4).

4.8 Total cost of care to end of treatment

None of the RCTs measured this outcome.

4.9 Binge eating frequency one year following end of treatment or two years since baseline

One trial measured this outcome (Zeeck 2009). There was no clear difference in frequency of binge eating between settings (MD 0.43, 95% CI -0.27 to 1.13; 1 RCT, 43 participants; Analysis 4.5).

Subgroup analyses

As there was only one trial for Comparison 4 that included participants with bulimia nervosa, binge eating disorder and OSFED bulimia nervosa or binge eating disorder, we were unable to conduct a subgroup analysis of groups of DSM-5 diagnoses for bulimia nervosa, binge eating disorder, or OSFED (APA 2013).

As all trials of anorexia nervosa included adolescents (Gowers 2010; Herpertz-Dahlmann 2014; Madden 2014), or a mixed population of adults and adolescents (Crisp 1991), we were unable to conduct a subgroup analysis for age groups of < 18 years and ≥ 18 years.

As all trials of anorexia nervosa included family therapy in the inpatient programme, we were unable to conduct a subgroup analysis for family-based inpatient programmes and non-family-based inpatient programmes. Similarly, as no trial used cognitive behaviour therapy as the sole psychological therapy, we were unable to conduct a subgroup analysis of cognitive behaviour therapy versus other individual psychotherapies.

DISCUSSION

Summary of main results

This review identified five trials (N = 566 participants) comparing inpatient care with outpatient, partial hospitalisation, brief hospital care followed by outpatient, or no active intervention.

Four (N = 511) were trials of people with anorexia nervosa. In three trials (310 participants), we found no significant differences in the primary outcome of increased weight, or secondary outcomes of reduced severity of depression or general psychiatric symptoms in people randomised to (i) inpatient care for weight restoration provided by a specialist eating disorder service and health professionals versus (ii) individual (Crisp 1991), or family-based manualised and non-manualised (Gowers 2010) outpatient care or (iii) time-limited inpatient care with discharge before full weight restoration and planned outpatient family-based care (Madden 2014). However, people were significantly more likely to complete treatment when randomised to outpatient care settings. There was no clear difference in achieved levels of remission between settings, but where reported, were in the anticipated range of over 50% (Costa 2016).

There was only one trial that compared inpatient care with no treatment or no active intervention for anorexia nervosa (Crisp 1991, N = 90), and two trials that compared inpatient care with partial hospital care, one for anorexia nervosa (Herpertz-Dahlmann 2014, N = 172), and one for bulimia nervosa (Zeeck 2009, N = 55), therefore, we were unable to complete meta-analyses for these comparisons. The two trials for anorexia nervosa reported no significant differences in outcomes between groups. Herpertz-Dahlmann 2014 was the only trial designed as a non-inferiority trial, and this large and generally well-conducted trial should stimulate more research and support for partial hospital care. The small trial for bulimia nervosa found no statistical difference between settings, but there were more participants who reported less binge eating in the partial hospital care group, which persisted at three-year follow-up, while those in the inpatient care group worsened. The trial was likely underpowered to find a difference in categorical outcomes of binge eating abstinence.

We were unable to conduct a meta-analysis of cost-effectiveness, due to lack of data. One trial assessed per-participant costs of each treatment, and reported significantly reduced costs for partial hospital care compared to inpatient care (Herpertz-Dahlmann 2014). Gowers 2010 conducted a cost-effective analysis based on health services utilisation during the follow-up period, and reported the greatest service use (and costs) were in the group randomised to non-eating disorder specialist outpatient care, mostly because of a higher readmission rate. An additional cost-effective acceptability analysis of 'willingness to pay nothing for a unit increase' for improved outcomes found that specialist outpatient services had the highest probability of being the most cost-effective, followed by inpatient care; non-specialist outpatient

care had the lowest probability of being cost-effective. Whilst at five-year follow-up there were no significant differences in the cost of health service use between groups, participants in both the inpatient and non-specialist outpatient groups were more likely to use more expensive private facilities. They examined predictors of total cost, and found the strongest was baseline severity of weight loss. Thus, outpatient care that results in more inpatient admission may not be the most cost-effective over time, and may be less cost-effective for people with more severe illness.

Overall completeness and applicability of evidence

There were insufficient data for any disorder other than anorexia nervosa, and insufficient data for three of the four comparisons. Interventions varied, not only by setting, but by the treatment packages delivered in those settings. Each trial had unique control interventions limiting the completeness of the evidence. One trial was very old and we were unable to obtain sufficient data on weight outcomes for our analysis (Crisp 1991).

Overall, the quality and completeness of evidence were insufficient for all comparisons. More research is needed to guide practitioners, people with eating disorders, and healthcare providers on the optimal treatment setting for people with less severe anorexia nervosa and other eating disorders.

Quality of the evidence

For comparison number one, specialist inpatient care compared with active outpatient or a combination of brief hospital and outpatient care, there was low-quality evidence that there was little clear difference between settings for weight gain or BMI improvement, and very low-quality evidence that the outpatient setting was more acceptable. We assessed a high risk of bias due to the lack of blinding of participants overall, and in one study, assessed allocation concealment and randomisation to be at an unclear risk of bias (Crisp 1991). We found very few trials that met our inclusion criteria, and in all of the trials, the outpatient comparators differed. We only found one trial for each of the other comparisons. Thus, it is very likely that future research may change the estimate of effects for all comparisons.

Potential biases in the review process

We think we identified all relevant trials, since we undertook broad-based searches of published and ongoing trials, and corresponded (where possible) with the authors. We followed standard Cochrane procedures in dealing with the Madden 2014 trial whereby an author not on the Madden 2014 trial (in this instance SL) extracted data.

Agreements and disagreements with other studies or reviews

This review agreed with an older review (Meads 2001), and international evidence based guidelines (APA 2006; Herpetz 2011; NICE 2004), which included data from Crisp 1991, and a more recent review, which included data from Gowers 2010, and noted Madden 2014 (Watson 2013). Although this review included new data from three RCTs, the number of RCTs is still small and the evidence is still low quality. This review agreed with the conclusions of the guidelines that more research is required, in particular, the optimal treatment setting and duration, tailored to the stage of illness and diagnostic status (APA 2006; Herpetz 2011; NICE 2004).

AUTHORS' CONCLUSIONS

Implications for practice

This review found insufficient evidence for superiority of any treatment setting (inpatient, outpatient, reduced length of inpatient followed by outpatient, or partial hospital care) for anorexia nervosa or any other eating disorder. Clinical practice guidelines agree that an outpatient setting is the first choice for treatment of most eating disorders, but vary in supporting it for anorexia nervosa (APA 2006; Herpetz 2011; NICE 2004). Patient safety (severity of medical and psychiatric illness) and preference, access to levels of care, and cost are important considerations in determining treatment setting in anorexia nervosa (and other eating disorders).

Implications for research

Replication studies are needed of all trials. Future trials should replicate the content of treatment programmes, as at present, all trials in this review assessed different treatment packages in the settings. There may be benefits of a treatment setting that are not supported in superiority trials, and future trials should have sample sizes adequate enough to enable equivalency analyses, to increase confidence in the choice of treatment setting. Trials should also address how to tailor the choice of treatment setting according to clinical indicators and illness severity, and integrate RCTs with empirical studies of illness staging. As cost is a very relevant and important consideration with regards to treatment setting, and may impact service use and longer term disability, future RCTs should examine the cost-effectiveness of the treatments, as well as follow participants over time (e.g. Gowers 2010).

Because of medical and psychiatric complications, It may be unsafe to treat people with anorexia nervosa in an outpatient setting. Therefore, there is a particular imperative for more trials that compare inpatient care with specialist outpatient or partial hospitalisation in those with anorexia nervosa, as well as similar trial designs for people with other eating disorders. There were no trials that focused or reported separately on manualised individual outpatient care for adults with anorexia nervosa. This is a major gap in the evidence for this population.

The trials in this review also encompass a period where there have been notable changes in the diagnostic criteria for eating disorders. Future updates of this and other reviews should consider subgroup analyses exploring the effect of using different diagnostic schemes.

The remission rates reported in the included trials were commensurate with other reviews of anorexia nervosa treatments, but up to 50% of participants may not achieve this, therefore, research into therapeutic strategies to improve remission rates is also indicated.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Crisp 1991

Methods	Randomised controlled trial, parallel design with 4 intervention arms
Participants	**N = 90**; no reported a priori power analysis. The study was unlikely to be adequately powered. **Diagnosis**: anorexia nervosa, unclear % of binge-purge sub-type **Method of diagnosis**: DSM-III criteria; sequential referrals (1983 to 1987); duration of illness < 10 years; and living within outpatient reach of the service **Age**: mean 21.7 years (SD 1.9 to 4.7), mix of adolescents and adults **Sex**: all female **Location**: Great Britain **Duration of illness**: mean 39 months (range 4 to 107) **Other:** exclusions were high; in one year, only 21/68 new cases to the service met inclusion criteria, with 6 males and 6 near-normal weight females with anorexia nervosa excluded
Interventions	Participants were randomly assigned to either: 1. Inpatient treatment for several months, followed by 12 months of outpatient psychotherapy, N = 30 2. Outpatient individual and family psychotherapy (12 sessions) from experienced eating disorder therapists, plus 4 separate dietary counselling sessions, over several months, N = 20 3. Outpatient monthly group psychotherapy (10 individual sessions for each patient and 10 separate sessions with their parents) over 10 months, from experienced eating disorder therapists, plus 4 separate dietary counselling sessions, N = 20 4. No further treatment (one-off option), but a detailed report with advice on further management was sent to the referring practitioner, N = 20 **Medication:** psychotropic drugs were not prescribed to any patient in active treatment groups 1, 2, or 3 during the study period, although it was acknowledged that it was not possible to avoid prescription from, for example, the family doctor
Outcomes	**Timepoints for assessment**: baseline, and 1, 2 and 5 years following baseline **Outcomes (primary and secondary not differentiated):** 1. Body weight 2. Number who completed treatment 3. Morgan-Russell outcome assessment schedule mean scores The Morgan-Russell outcome assessment schedule mental state was used to measure general psychiatric symptoms (note: a higher score indicates better mental health). (Note: In the meta-analyses, we pooled data from the 2 specialist outpatient groups)

Crisp 1991 *(Continued)*

Notes	**ClinicalTrials.gov Identifier:** pre-dates registration of trials **Date of study recruitment**: 1983 to 1987 **Funding source**: Marks and Spencer plc, St George's Hospital Special Trustees, Worshipful Company of Grocers **Declarations of interest among the primary researchers**: none **Correspondance:** none Body weight data were incomplete - author deceased and not contacted

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not described
Allocation concealment (selection bias)	Unclear risk	Not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	Outcome assessments were not blinded
Incomplete outcome data (attrition bias) All outcomes	High risk	81% of participants were described as compliant with study treatment. However, there was also a low threshold for treatment completion i.e. completing a minimum of 5/12 therapy sessions. Treatment attrition was also high in inpatient intervention arm (12/30, 40%).
Selective reporting (reporting bias)	Low risk	All participants were included in initial analyses and both completer and non-completer analyses were presented. A 2-year follow-up was reported separately on only two groups, the outpatient monthly group psychotherapy (10 individual sessions for each patient and 10 separate sessions with their parents) and the 'one-off' group.
Other bias	Low risk	Groups were comparable after randomisation.

Gowers 2010

Methods	Randomised controlled trial, parallel design with 3 intervention arms
Participants	**N = 167**; sample size was determined by a priori power analysis **Diagnosis**: anorexia nervosa, 40/167 (24%) binge-purge subtype **Method of diagnosis**: DSM-IV criteria modified for age group: • food restriction ± compensatory behaviours • weight below 85% of that expected within 1 month of assessment, based on age and current height or previous height centile

Gowers 2010 *(Continued)*

- intense fear of gaining weight or undue influence of weight or shape on self-evaluation
- primary or secondary amenorrhoea for 3 months (in females), or menstruation only while on the contraceptive pill

Age: adolescents, mean age 14 years 11 months (range 11 years 11 months to 17 years 11 months)

Sex: 153 (92%) female

Location: Great Britain

Duration of illness: mean 13 months

Other: those with learning difficulties, or severe co-morbid physical conditions (or combination) were excluded

Interventions	Participants were randomly assigned to either: 1. Multi-disciplinary inpatient care in child and adolescent psychiatric units, N = 57 2. Eating disorder specialised outpatient care including motivational interviewing, CBT, and family counselling, N = 55 3. Outpatient non-eating disorder specialist psychiatric treatment with family sessions that were not provided according to a treatment manual, N = 55 **Medication:** specific medication use was not directly reported, but data were collected and medication use cost were included in fiscal cost analyses. Use of medication ranged between 60,58% and 63% of participants in groups 1, 2, and 3 during the two year study period.
Outcomes	**Timepoints for assessment**: baseline, and 1, 2, and 5 years following baseline **Primary outcome**: Morgan-Russell outcome assessment schedule mean scores - the scale item mental state was used to measure general psychiatric symptoms (note: a higher score indicates better mental health). **Secondary outcomes**: 1. % body weight for height 2. Numbers completing treatment 3. Recovery - Morgan-Russell outcome assessment schedule score at end of 1 and 2 years 4. Health of the nation outcome scale for children and adolescents (clinician and self-reported) 5. Eating Disorder Inventory (EDI) version 2 6. Family Assessment device (FAD) 7. Mood and feeling questionnaire (depression rating) 8. Eating disorder examination 9. Costs of health care (over 2 and 5 years) (Note: in the meta-analysis, we pooled data from the 2 specialist outpatient groups for depression and for general psychiatric symptoms)
Notes	**Trial registration Identifier:** NRR number (National Research Register) N0484056615; Current controlled trials ISRCTN39345394 **Date of study recruitment**: unclear; trial dates: 01 January 2000 to 30 June 2009 **Funding source**: Health Technology Assessment commissioned as project number 97/42/02. **Declarations of interest among the primary researchers**: none **Correspondance:** we approached the authors for information on total costs of each treatment with no information received
Risk of bias	

Gowers 2010 *(Continued)*

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	The authors reported "treatment allocation was carried out by an independent randomisation service using stochastic minimisation controlling for gender, age (above and below 16 years) and BMI (above and below 15)".
Allocation concealment (selection bias)	Low risk	See above
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants and personnel were not blinded
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Assessors were blind to treatment group.
Incomplete outcome data (attrition bias) All outcomes	High risk	60 participants (35%) did not complete treatment (treatment attrition), which was highest in the inpatient group.
Selective reporting (reporting bias)	Low risk	161/170 (95%) of participants were included in analyses of outcome
Other bias	Low risk	Groups were matched on baseline comparisons.

Herpertz-Dahlmann 2014

Methods	Parallel-group non-inferiority randomised controlled trial at 6 specialised treatment sites for adolescent anorexia nervosa participants.
Participants	**N = 172**; sample size was determined by a priori power analysis **Diagnosis**: anorexia nervosa; 31/172 (18%) binge-purge subtype **Method of diagnosis**: DSM-IV - BMI below the tenth percentile, and no prior hospital admission for anorexia nervosa **Age**: mean age 15.2 years (SD 1.5); range 11 years to 18 years **Sex**: all female **Location**: Germany **Duration of illness/weeks**: 53.7 (SD 39.6) inpatient; 42·4 (SD 33·1) day patient **Other:** nil
Interventions	Following a 3-week admission for medical stabilisation, participants were randomised to a multimodal multidisciplinary eating disorder specialist treatment programme based on weight restoration, nutritional counselling, cognitive behavioural therapy, and family therapy provided at 1. an inpatient specialist unit, N = 85, or 2. a daypatient specialist unit. N = 87 When participants met discharge criteria (maintaining weight between 15th and 20th age adjusted percentiles for 2 weeks), they received outpatient care until 12-month follow-up.

Herpertz-Dahlmann 2014 *(Continued)*

	Medication: use was not reported.
Outcomes	**Timepoints for assessment**: admission, discharge, 12 months after admission (follow-up), or readmission (if this occurred) **Primary outcome**: the difference in BMI between the time of admission and the 12-month follow-up or the time of an eating disorder-related readmission, adjusted for age and duration of illness **Secondary outcomes** 1. Number completing treatment 2. Clinical response: number with BMI ≥ 10th percentile 3. Morgan-Russell outcome assessment schedule scores 4. Brief symptom inventory total scores 5. Difference in health insurances cost from admission to discharge 6. The Eating Disorder Inventory version 2 7. Number of eating disorder-related readmissions 8. Number of patients lost to follow-up
Notes	**Trials registration identifier:** ISRCTN67783402, and DRKS00000101 **Date of study recruitment**: 2 February 2007 to 27 April 2010 **Funding source**: German Ministry for Education and Research grants 01GV0602 and 01GV0623 **Declarations of interest among the primary researchers**: CF received grants from Bristol-Myers-Squibb, Novartis, Shire, and Pfizer UH received grants for research support from Eli Lilly and Co and Otsuka BH-D received industry research funding from Medice and Vifor KK received speaking stipends from Medice and Lilly and industry research funding from Vifor EP received a speaker's stipend from Infectopharm AW received industry research funding from Medice CW received industry research funding from Shire All other authors declared that they had no conflicts of interest

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	The randomisation sequence was computer generated. The randomisation procedure was a covariate-adaptive procedure according to Rosenberger and Lachin, and stratification was done for site, age (< 14 and ≥14 years), and BMI (< 15.5 and ≥15.5).
Allocation concealment (selection bias)	Low risk	An independent Clinical Trials Centre did centralised, concealed randomisation which was advised by fax at the beginning of week 3, after the patients were enrolled into the study.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Authors reported that patients and therapists could not be blinded to treatment allocation.

Herpertz-Dahlmann 2014 *(Continued)*

Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Assessors were initially masked, but some patients inadvertently revealed their treatment allocation; masking was maintained for the primary outcome (BMI). All assessments of patients were done personally, by specifically trained child and adolescent psychiatrists or psychologists who were not involved in the treatment.
Incomplete outcome data (attrition bias) All outcomes	Low risk	29/172 (16%) treatment attrition
Selective reporting (reporting bias)	Unclear risk	15% participants were not included in analyses
Other bias	Low risk	Groups were matched on baseline comparisons

Madden 2014

Methods	Randomised parallel group superiority trial
Participants	**N = 82**; sample size was determined by a priori power analysis. **Diagnosis**: anorexia nervosa, 25/82 (30.51%) binge-purge subtype **Method of diagnosis**: DSM-IV and DSM-5 criteria of less than 3 years duration who were medically unstable **Age**: mean 14.89 years (SD 1.46); range 12 years to 18 years **Sex**: 78 (95%) female **Location**: Australia **Duration of illness**: 7.62 months (SD 6.16) **Other:** consecutive admissions to two specialised paediatric units, domiciled within 2 hours on the unit to allow for family-based sessions, and not receiving any other psychotherapy
Interventions	Participants were randomly assigned to either: 1. Medical stabilisation: specialist hospital care with nasogastric-supported refeeding (minimum 14 days) until no markers of medical instability for 72 hours after nasogastric feeds ceased, N = 41 2. Weight restoration: specialist hospital care with nasogastric-supported refeeding (minimum 14 days) until no markers of medical instability for 72 hours after nasogastric feeds ceased and reached 90% of expected body weight, N = 41 The hospital care for both interventions included: a hospital-based school, a daily adolescent group programme and daily physiotherapy programme, supportive psychotherapy, family psycho-education, preparation for outpatient family-based therapy, and dietitian-lead nutritional education. Adolescent group activities included art and creative pursuits, psycho-education, and psychological skills development. Participants in both groups were discharged to outpatient family-based therapy. **Medication**: Medication was prescribed according to usual practice, with no further reports
Outcomes	**Timepoints for assessment**: hospital admission, hospital discharge, end of family-based therapy (session 20), 6- and 12-month follow-up **Primary outcome**: number of hospital days following initial admission, at 12-month follow-up **Secondary outcomes**:

Madden 2014 *(Continued)*

1. The total number of hospital days until 12-month follow-up
2. Full remission, defined as healthy weight (> 95% expected body weight (EBW)) and a global eating disorder examination (EDE) score within 1 standard deviation (SD) of published means

Unpublished outcomes and outcomes relevant to this review:

1. BMI or weight – not reported, % expected body weight data were obtained from the authors
2. Numbers completing treatment protocol
3. Numbers achieving weight restoration – unpublished data were obtained from the authors
4. Full or partial remission comparable to Morgan-Russell outcome assessment schedule of good or intermediate. Partial remission was defined as over 85% EBW, which is comparable to Morgan-Russell outcome assessment schedule intermediate outcome and DSM-IV weight criteria.
5. Revised Child Anxiety and Depression Scale – unpublished data were obtained from the authors

Other outcome data not used in forest plots included:

1. Eating Disorder Examination (Child or adult version as appropriate),
2. Children's Obsessive Compulsive Inventory, and
3. Rosenberg self-esteem scale, days in hospital.

Notes

Trial registration Identifier: ACTRN012607000009415 (www.anzctr.org.au)

Date of study recruitment: June 2007 and February 2010

Funding source: NHMRC Grant ID 457235

Declarations of interest among the primary researchers:

J Lock receives funding from the National Institutes of Health (NIH; R01 MH079978-02, K24-MH07446709, R03MH09614402, R21MH09677901, R34MH09349302) and the Davis Foundation, royalties from Guilford Press and Oxford University Press, and consultant payments from the Training Institute for Child and Adolescent Eating Disorders.

D Le Grange receives funding from NIH (R01 MH079979, R34-MH093768), the Baker Foundation, the National Eating Disorders Association (NEDA), and Insight Behavioral Health, LLC, royalties from Guilford Press and Routledge, and consultant payments from the Training Institute for Child and Adolescent Eating Disorders, LLC.

A Wallis and P Rhodes receive royalties from IP Communications.

P Hay and S Touyz receive royalties from Hogrefe and Huber and McGraw-Hill.

Correspondance: Authors provided unpublished data.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Clusters of 6 created by external statistician who created a blind random binary list
Allocation concealment (selection bias)	Low risk	Conducted by an external statistician
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Clusters were used to minimise effects of participants in different groups being treated alongside each other.
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessment conducted by a clinical psychologist blind to treatment group.

Madden 2014 *(Continued)*

All outcomes		
Incomplete outcome data (attrition bias) All outcomes	Low risk	Treatment attrition was low, 78/82 (95%) received treatment per protocol, none were lost to follow-up.
Selective reporting (reporting bias)	Low risk	Analyses were conducted on the whole group.
Other bias	Low risk	Groups were matched on baseline comparisons.

Zeeck 2009

Methods	Parrallel design randomised controlled trial with two arms
Participants	**N = 55**; sample size was determined by a priori power analysis. **Diagnosis**: bulimia nervosa **Method of Diagnosis**: DSM-IV or ICD-10 criteria **Age**: inpatients: 24.0 years (SD 7.6); daypatients; 26.2 years (SD 7.2); all > 18 years **Sex**: 40 (93%) female **Location**: Germany **Duration of illness**: inpatients: 7.0 years (SD 6.5); daypatients 10.5 years (SD 7.6) **Other:** co-located (within one hour) to the clinic, too unwell for or failed outpatient care (or both)
Interventions	Participants were randomly assigned to either: 1. The day hospital with daily hours from 8 a.m. to 4 p.m. over 5 days a week, for a mean duration of 86.7 days (SD 23.6), N = 22 2. Inpatient treatment with a mean duration of 93.2 days (SD 32.7), N = 21 Both interventions used specialist psychodynamically informed and symptom-orientated therapy with behavioural approaches (treatment contract, meal plans, eating diaries), one or two family sessions, cognitive behavioural group therapy, and individual therapy addressing psychodynamic and interpersonal aspects and mood regulation Continued outpatient therapy after discharge was recommended but not standardised. Mean duration of treatments did not differ. **Medication:** Fluoxetine 60 mg or other medication was prescribed according to pre-determined indication and need. In 23 participants, antidepressive medication continued or started during treatment, with no significant difference between groups. At the 3-month follow-up, 70% of the inpatients and 62% of the day clinic patients had continued their medication (no significant difference between groups).
Outcomes	**Timepoints for assessment**: randomisation, beginning of treatment, every 4 weeks during treatment, at the end of treatment, and at 3-month, 12-month, and 36-month follow-up **Primary outcomes**: 1. Change in the Eating Disorder Inventory (EDI) bulimia scale, and 2. Deterioration after discharge (a worsening on the scale).

Zeeck 2009 *(Continued)*

Secondary outcomes:

1. Scores on EDI bulimia scale,
2. Binge eating frequency,
3. Remission (no binging, no purging and < 2 on the Structured Interview for Anorexia and Bulimia Nervosa (SIAB) body shape and weight preoccupation scale),
4. Purging frequency,
5. General psychiatric symptom on the Brief Symptom Inventory (the SCL-90-R).

Notes

Trial registration Identifier: ISRCTN No. 30183796

Date of study recruitment: January 2003 to March 2006

Funding source: ZE 520/4-1 (German Research Foundation DFG)

Declarations of interest among the primary researchers: None declared

Correspondance:

Authors provided additional information on blinding and binge eating abstinence outcomes:

Monday, 21 March 2016

Instrument: SIAB-expert rating (item 23; for the time point at discharge, binge frequency was related to the last 4 weeks)

At discharge, 10/43 patients (23%) were binge abstinent for the last 4 weeks (7 inpatient and 3 day hospital participants)

At the one-year follow-up, 12/38 (32%; missing data from 5 patients) were binge abstinent for the last three months (3 inpatient and 9 day hospital participants)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Randomisation done by shuffling 100 numbered sealed envelopes containing one of the two allocation arms (50 each).
Allocation concealment (selection bias)	Low risk	A single shuffled sealed envelope was provided by the medical documentation assistant to the recruiting therapist at time of informed consent. The recruiting therapist opened the envelope and advised the participant.
Blinding of participants and personnel (performance bias) All outcomes	High risk	It was not possible to blind participants, therapists, or investigators.
Blinding of outcome assessment (detection bias) All outcomes	High risk	The end of treatment and follow-up assessments were conducted by a research assistant not involved in treatment. The authors confirmed in an email, dated 18 March 2016, that: "The assessments at discharge could not be blinded, as the research assistant had to see the patients during their last days of treatment (and had to visit the day hospital or the inpatient unit)".
Incomplete outcome data (attrition bias) All outcomes	Low risk	Follow-up reported to 3-years. Follow-up attrition was low, 4/55 (7%). Treatment attrition (i.e. numbers who completed treatment) was also low, 7/55 (13%).
Selective reporting (reporting bias)	Low risk	Completers and intention-to-treat data on the whole group were both reported.

Zeeck 2009 *(Continued)*

Other bias	Low risk	Groups were matched on baseline comparisons.

BMI - Body Mass Index
SIAB - Structured Interview for Anorexia and Bulimia Nervosa

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Boege 2015	Multiple diagnoses and included only 4 (3%) with an eating disorder that was not specified.
Castelnuovo 2011	Comparator of inpatient care followed by low cost telephone outpatient cognitive behavioural therapy or brief strategic therapy. Not a direct comparator of treatment setting or different duration of inpatient care.
Eisler I	Did not include an inpatient treatment arm. Registration ISRCTN11275465 - see Studies awaiting classification) but not the full report.
Kong 2005	The comparison was of a day patient treatment programme versus outpatient care and did not include an inpatient comparison arm.

Characteristics of studies awaiting assessment *[ordered by study ID]*

ISRCTN11275465

Methods	Three-arm randomised controlled trial
Participants	Adolescents with anorexia nervosa, aged 13 to 20 years
Interventions	**Inpatient treatment**: This was based around a carefully structured nursing regimen, the main aims of which were to form a therapeutic alliance and to achieve weight restoration. Other members of the multidisciplinary team provided additional therapeutic input, depending on the needs of individual patients. Patients allocated to inpatient treatment were admitted to a specialist eating disorder unit for approximately 12 weeks; length of inpatient stay was determined by the time needed for each individual patient to reach a healthy weight. The study design limited the length of time from reaching a healthy weight to discharge from hospital to two weeks. Following discharge from hospital, participants received regular follow-up treatment for six months for themselves and their families. The overall length of treatment (i.e. inpatient plus follow-up) was 12 months. **Outpatient family therapy for adolescent anorexia nervosa**: Participants were seen for a number of sessions over a period of 12 months. These were mainly conjoint family meetings, although some individual sessions were included where appropriate (particularly with older adolescents at later stages of the treatment). Therapy began with an emphasis on the parents taking control of re-nutrition, with a gradual move towards conversations exploring more general implications of adolescence for children and parents, as soon as the nutrition level was safe. The aim was to help the family to disentangle individual psychological issues (e.g. self esteem, individuation, psychosocial functioning) and family relationship issues from the eating disorder behaviour and the interactional patterns that had developed around it. Multiple-Family Day Treatment (MFDT) is a new treatment programme that provides a more intensive form of family intervention than the usual outpatient family therapy, but is conceptually very similar. In common with the outpatient family therapy, MFDT aimed to help families rediscover their own resources by emphasising ways in which parents can take control of re-nutrition. At the same time, the families were encouraged to use the group setting to explore how the eating disorder and the interactional patterns in the family had become entangled, making it difficult for the family to follow the normal developmental course of the family life-cycle. The sharing of expe-

ISRCTN11275465 *(Continued)*

	riences and the dynamics of the multiple family group were important components of the treatment. The treatment started with an intensive one week multiple family day programme for up to six families, and was followed by a further four to five one-day meetings at four- to eight-week intervals. Individual family meetings were scheduled in the intervals between group meetings as needed, with the overall length of treatment for each family being 12 months. A wide range of intervention techniques was used (including group, family, psycho-educational, and creative techniques), with multiple family, parent, or adolescent groups, as well as individual family meetings. There was also practical input around managing mealtimes and food.
Outcomes	Primary outcome measures: 1. Symptomatic change: 1.1. Body Mass Index 1.2. Severity of Eating Disorder (SEED) symptomatology 1.3. Eating Disorder Examination (EDE) scale scores 1.4. Children's Eating Disorder Examination (C-EDE) 2. Health economic costs: 2.1. Client service receipt inventory Secondary outcome measures 1. Client and family satisfaction questionnaire 2. Experience of caregiving
Notes	We approached the authors in December 2016. They advised the trial has been submitted for publication but this was of the two outpatient arms (Eisler I). No update in 2018.

NCT00184301

Methods	Randomised controlled trial, two arms, parallel assignment
Participants	Individuals with either anorexia nervosa or bulimia nervosa and a personality disorder. All women, aged 18 years to 45 years.
Interventions	Behavioural inpatient treatment lasting one year versus behavioural intensive outpatient treatment consisting of two-weekly group sessions, lasting one year
Outcomes	Scores on personality, interpersonal, eating disorder, and symptom scales
Notes	Study completed in October 2013. Authors were approached for data. No reply was recorded.

NCT00815815

Methods	Randomised controlled trial, two arms, parallel assignment
Participants	Diagnosis of anorexia nervosa, according to DSM-IV criteria Body mass index (BMI) less than 18.5 kg/m^2
Interventions	1. Continued inpatient treatment – participants will undergo inpatient hospital treatment until they have gained enough weight to be discharged.

NCT00815815 *(Continued)*	2. Sequenced treatment – participants will begin with inpatient treatment, transition to daypatient treatment, and then transition to outpatient treatment. Both are a Structured Behavioral Treatment. There are daily therapy sessions and a weight gain protocol involving set meals and exercise levels.
Outcomes	None available
Notes	Study is completed. Authors approached for data. Advised study was never published (high attrition problematic) and data not available.

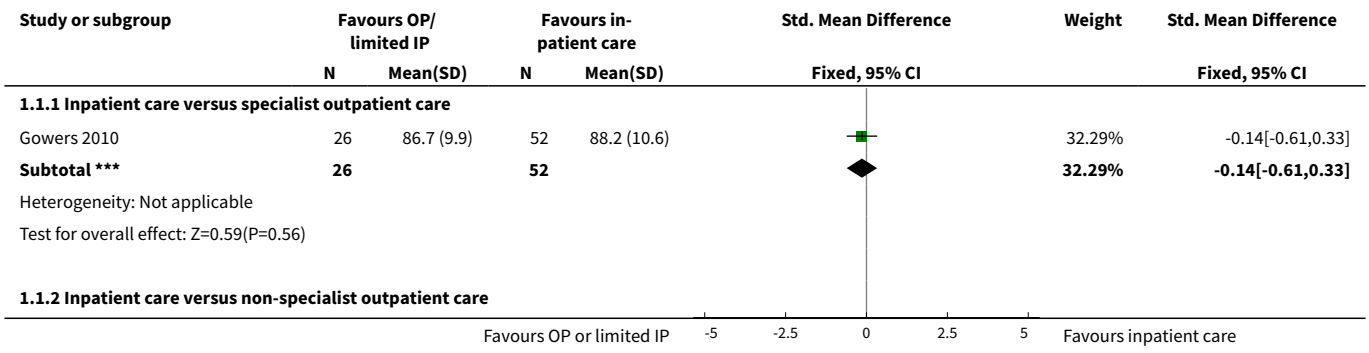
DATA AND ANALYSES

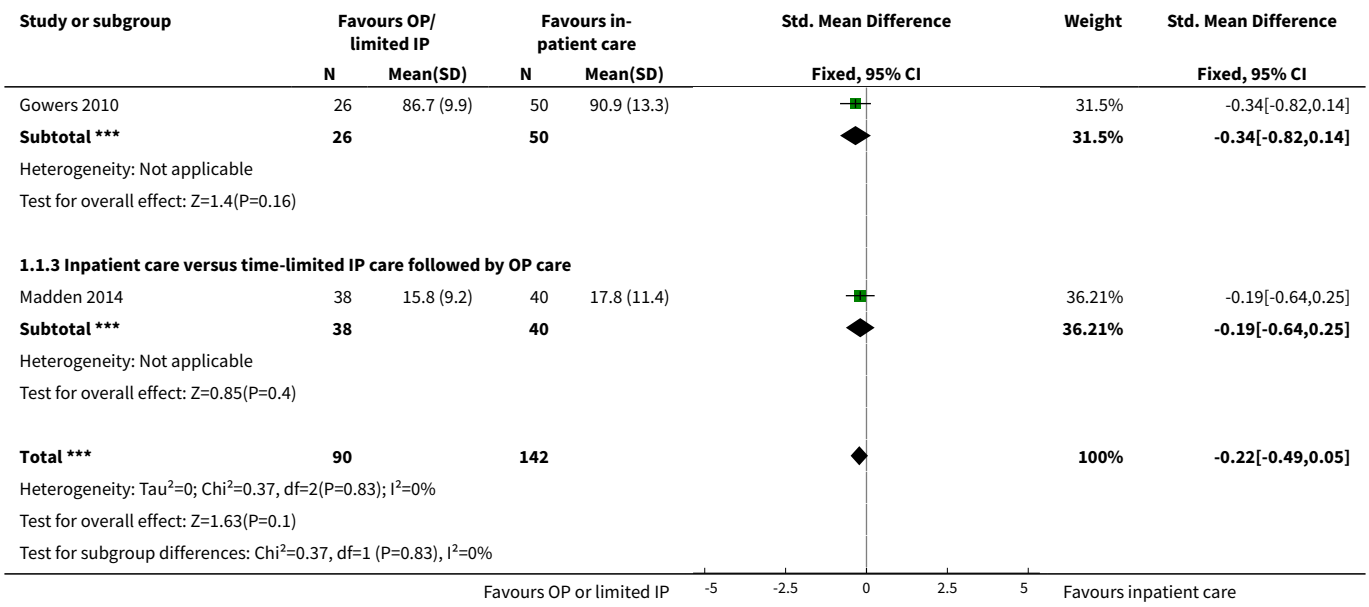
Comparison 1. Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Weight or BMI at end of treatment	2	232	Std. Mean Difference (IV, Fixed, 95% CI)	-0.22 [-0.49, 0.05]
1.1 Inpatient care versus specialist outpatient care	1	78	Std. Mean Difference (IV, Fixed, 95% CI)	-0.14 [-0.61, 0.33]
1.2 Inpatient care versus non-specialist outpatient care	1	76	Std. Mean Difference (IV, Fixed, 95% CI)	-0.34 [-0.82, 0.14]
1.3 Inpatient care versus time-limited IP care followed by OP care	1	78	Std. Mean Difference (IV, Fixed, 95% CI)	-0.19 [-0.64, 0.25]
2 Acceptibility: number of participants who completed treatment	3	319	Risk Ratio (M-H, Fixed, 95% CI)	0.75 [0.64, 0.88]
2.1 Inpatient care versus specialist outpatient care	2	154	Risk Ratio (M-H, Fixed, 95% CI)	0.67 [0.52, 0.86]
2.2 Inpatient care versus non-specialist outpatient care	1	83	Risk Ratio (M-H, Fixed, 95% CI)	0.72 [0.48, 1.09]
2.3 Inpatient care versus time-limited IP care followed by OP care	1	82	Risk Ratio (M-H, Fixed, 95% CI)	0.92 [0.76, 1.11]
3 Clinical response: end of treatment weight restoration to within the normal range	1	82	Risk Ratio (M-H, Fixed, 95% CI)	1.06 [0.65, 1.70]
3.1 Inpatient care versus time-limited IP care followed by OP care	1	82	Risk Ratio (M-H, Fixed, 95% CI)	1.06 [0.65, 1.70]
4 Recovery: a level of intermediate or better on Morgan-Russell broad or narrow scale	2	234	Risk Ratio (M-H, Fixed, 95% CI)	0.93 [0.73, 1.17]

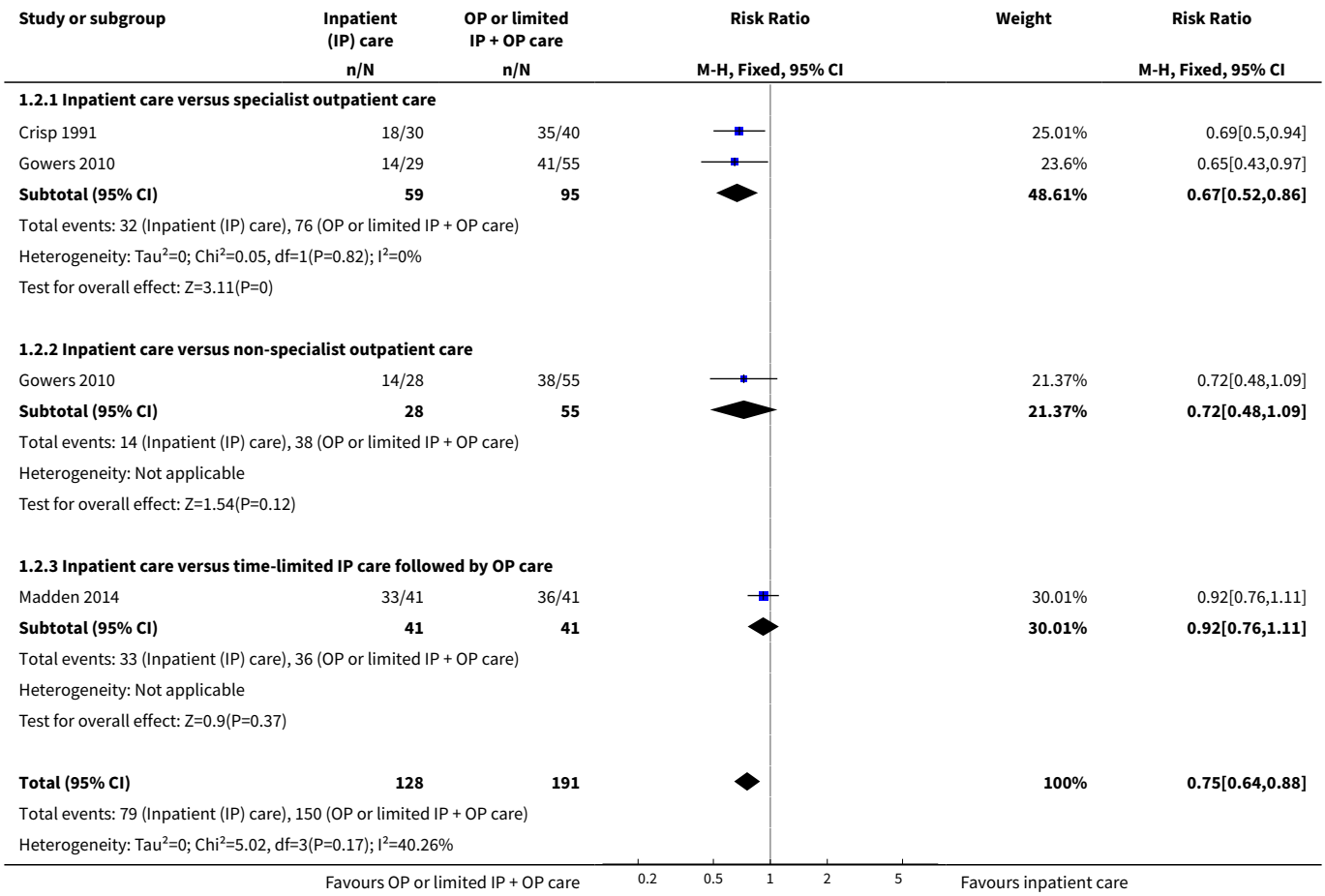
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
4.1 Inpatient versus specialist outpatient care	1	83	Risk Ratio (M-H, Fixed, 95% CI)	0.98 [0.64, 1.50]
4.2 Inpatient versus non-specialist outpatient care	1	82	Risk Ratio (M-H, Fixed, 95% CI)	0.75 [0.51, 1.08]
4.3 Inpatient care versus time-limited IP care followed by OP care	1	69	Risk Ratio (M-H, Fixed, 95% CI)	1.15 [0.74, 1.79]
5 Depression: symptom severity	2	196	Std. Mean Difference (IV, Fixed, 95% CI)	-0.20 [-0.49, 0.10]
5.1 Inpatient versus specialist outpatient care	1	67	Std. Mean Difference (IV, Fixed, 95% CI)	-0.07 [-0.58, 0.45]
5.2 Inpatient versus non-specialist outpatient care	1	68	Std. Mean Difference (IV, Fixed, 95% CI)	-0.33 [-0.84, 0.18]
5.3 Inpatient care versus time-limited IP care followed by OP care	1	61	Std. Mean Difference (IV, Fixed, 95% CI)	-0.19 [-0.69, 0.32]
6 General psychiatric symptom severity	2	227	Mean Difference (IV, Fixed, 95% CI)	-0.17 [-1.04, 0.69]
6.1 Inpatient versus specialist outpatient care	2	148	Mean Difference (IV, Fixed, 95% CI)	-0.07 [-1.20, 1.06]
6.2 Inpatient versus non-specialist outpatient care	1	79	Mean Difference (IV, Fixed, 95% CI)	-0.32 [-1.66, 1.02]
7 Weight or BMI at one year following end of treatment or two years since baseline	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
7.1 Inpatient care versus specialist outpatient care	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
7.2 Inpatient care versus non-specialist outpatient care	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

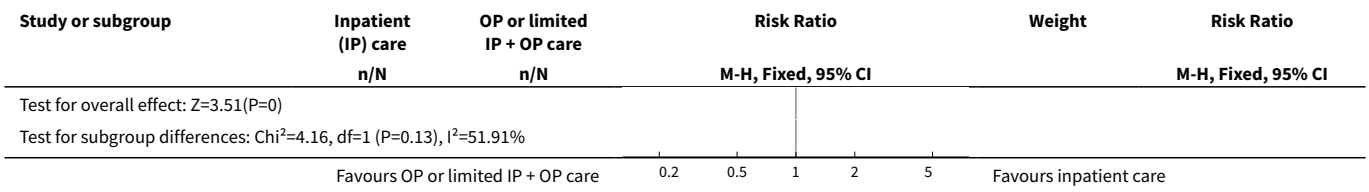
Analysis 1.1. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 1 Weight or BMI at end of treatment.



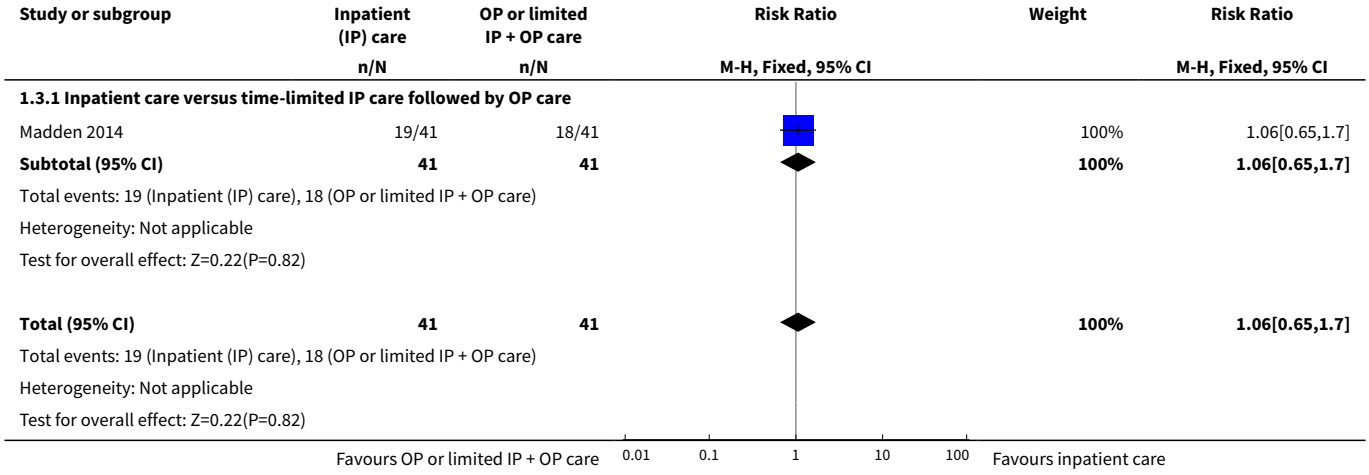


Analysis 1.2. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 2 Acceptibility: number of participants who completed treatment.

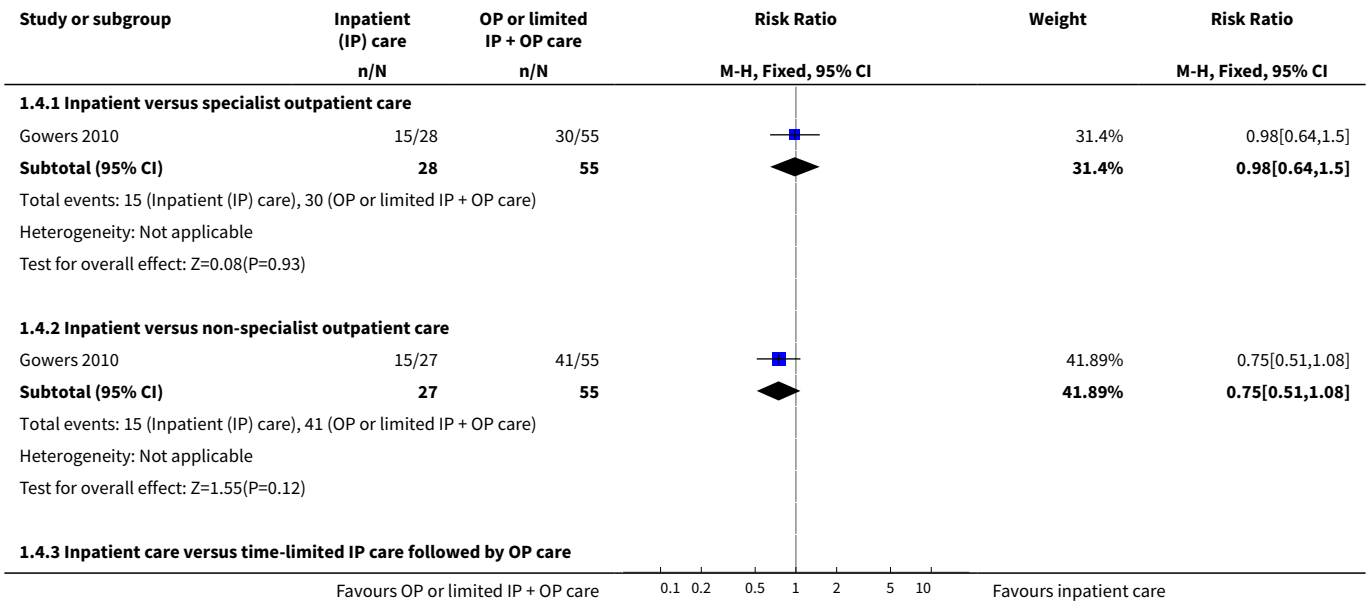


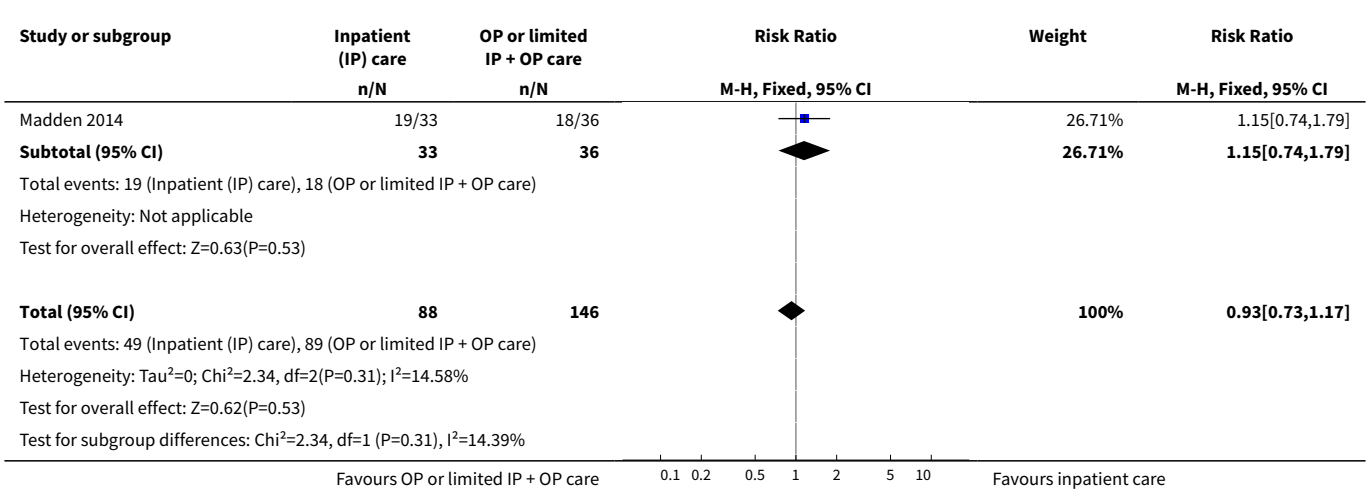


Analysis 1.3. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 3 Clinical response: end of treatment weight restoration to within the normal range.

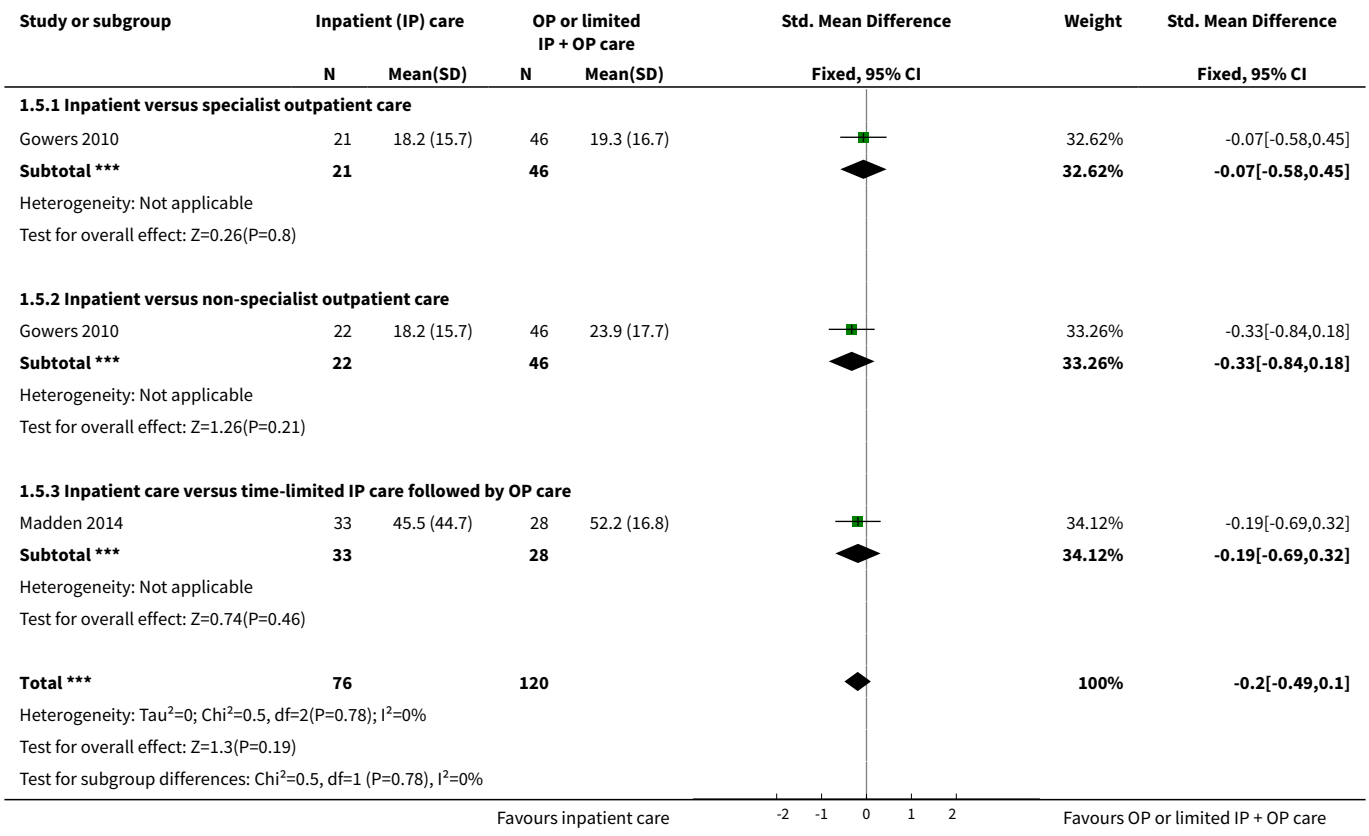


Analysis 1.4. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 4 Recovery: a level of intermediate or better on Morgan-Russell broad or narrow scale.



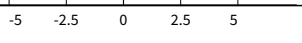


Analysis 1.5. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 5 Depression: symptom severity.



Analysis 1.6. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 6 General psychiatric symptom severity.

Study or subgroup	OP or limited IP care N	OP or limited IP care Mean(SD)	Inpatient care N	Inpatient care Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
1.6.1 Inpatient versus specialist outpatient care							
Crisp 1991	30	6.1 (4.9)	40	5.6 (3.6)		17.63%	0.5[-1.56,2.56]
Gowers 2010	26	7 (2.8)	52	7.3 (2.9)		40.95%	-0.31[-1.66,1.04]
Subtotal ***	**56**		**92**			**58.58%**	**-0.07[-1.2,1.06]**
Heterogeneity: Tau^2=0; Chi^2=0.42, df=1(P=0.52); I^2=0%							
Test for overall effect: Z=0.11(P=0.91)							
1.6.2 Inpatient versus non-specialist outpatient care							
Gowers 2010	26	7 (2.8)	53	7.3 (2.9)		41.42%	-0.32[-1.66,1.02]
Subtotal ***	**26**		**53**			**41.42%**	**-0.32[-1.66,1.02]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.47(P=0.64)							
Total ***	**82**		**145**			**100%**	**-0.17[-1.04,0.69]**
Heterogeneity: Tau^2=0; Chi^2=0.5, df=2(P=0.78); I^2=0%							
Test for overall effect: Z=0.39(P=0.7)							
Test for subgroup differences: Chi^2=0.08, df=1 (P=0.78), I^2=0%							



Favours OP or limited IP + OP care — Favours inpatient care

Analysis 1.7. Comparison 1 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus active outpatient (OP) or combined brief hospital and outpatient care, Outcome 7 Weight or BMI at one year following end of treatment or two years since baseline.

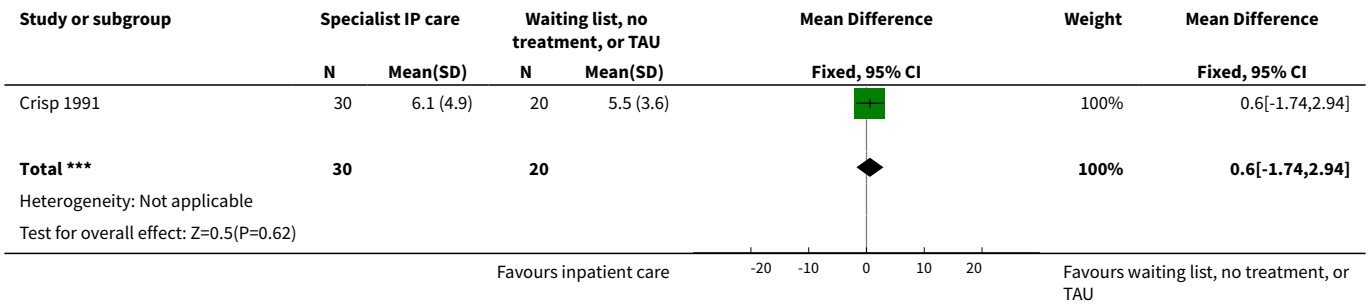
Study or subgroup	Inpatient (IP) care N	Inpatient (IP) care Mean(SD)	OP or limited IP + OP care N	OP or limited IP + OP care Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
1.7.1 Inpatient care versus specialist outpatient care						
Gowers 2010	51	90.5 (13.4)	50	90.1 (9.8)		0.35[-4.21,4.91]
1.7.2 Inpatient care versus non-specialist outpatient care						
Gowers 2010	51	90.5 (13.4)	46	94.2 (13)		-3.72[-8.96,1.52]

Favours OP or limited IP + OP care — Favours inpatient care

Comparison 2. Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus waiting list, no active treatment, or treatment as usual (TAU)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 General psychiatry symptom severity	1	50	Mean Difference (IV, Fixed, 95% CI)	0.60 [-1.74, 2.94]

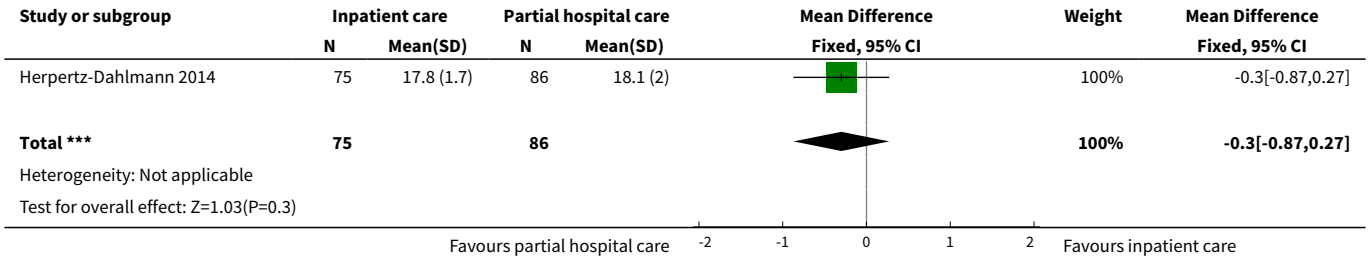
Analysis 2.1. Comparison 2 Specialist inpatient (IP) care for weight restoration in anorexia nervosa versus waiting list, no active treatment, or treatment as usual (TAU), Outcome 1 General psychiatry symptom severity.



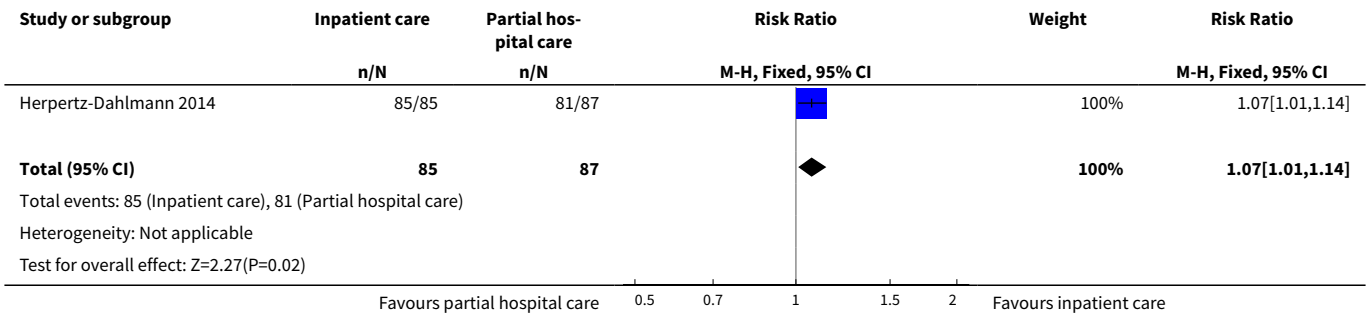
Comparison 3. Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Weight or BMI at end of treatment	1	161	Mean Difference (IV, Fixed, 95% CI)	-0.30 [-0.87, 0.27]
2 Acceptability: number of participants who completed treatment	1	172	Risk Ratio (M-H, Fixed, 95% CI)	1.07 [1.01, 1.14]
3 Clinical response: end of treatment weight restoration to within the normal range	1	172	Risk Ratio (M-H, Fixed, 95% CI)	0.99 [0.85, 1.16]
4 Recovery: a level of intermediate or better on Morgan-Russell narrow or broad scale	1	167	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.66, 1.40]
5 General psychiatric symptom severity	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
5.1 General psychiatric symptom severity	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6 Total cost of care to end of treatment	1	172	Mean Difference (IV, Fixed, 95% CI)	8.37 [3.52, 13.21]

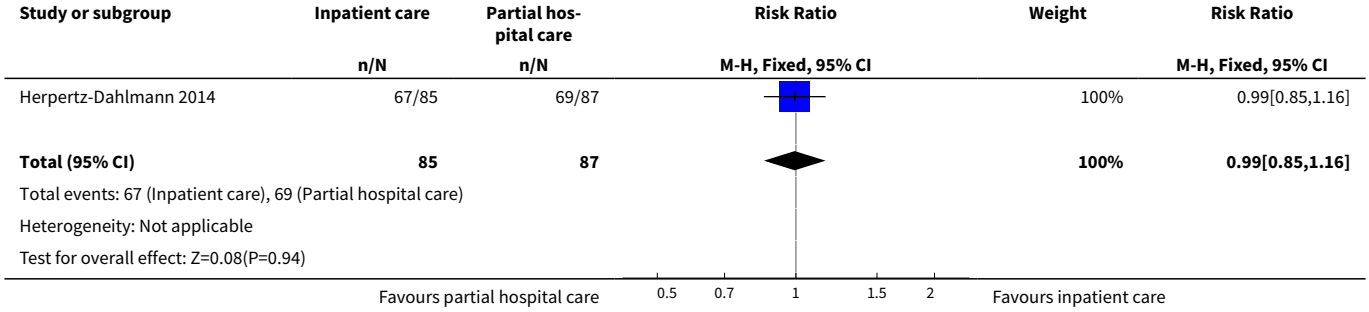
Analysis 3.1. Comparison 3 Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care, Outcome 1 Weight or BMI at end of treatment.



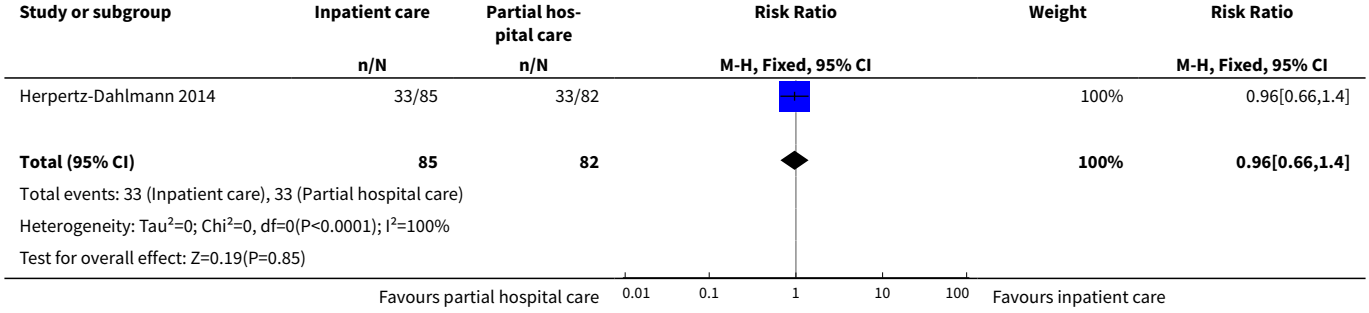
Analysis 3.2. Comparison 3 Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care, Outcome 2 Acceptability: number of participants who completed treatment.



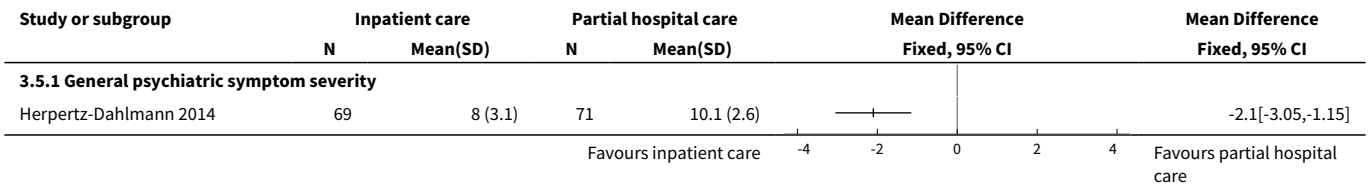
Analysis 3.3. Comparison 3 Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care, Outcome 3 Clinical response: end of treatment weight restoration to within the normal range.



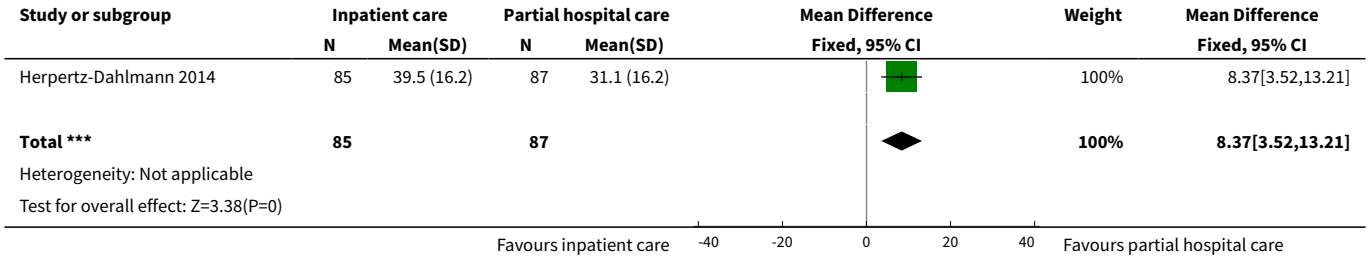
Analysis 3.4. Comparison 3 Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care, Outcome 4 Recovery: a level of intermediate or better on Morgan-Russell narrow or broad scale.



Analysis 3.5. Comparison 3 Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care, Outcome 5 General psychiatric symptom severity.



Analysis 3.6. Comparison 3 Specialist inpatient care for weight restoration in anorexia nervosa versus partial hospital care, Outcome 6 Total cost of care to end of treatment.



Comparison 4. Specialist inpatient care for bulimia nervosa, binge eating disorder, or other specified feeding or eating disorder (OSFED) bulimia nervosa or binge eating disorder type versus partial hospital care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Binge eating: frequency	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 Bulimia nervosa	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Acceptability: number of participants who completed treatment	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 Bulimia nervosa	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Binge eating: abstinence	1		Risk Ratio (M-H, Random, 95% CI)	Totals not selected
3.1 Bulimia nervosa	1		Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
4 General psychiatric symptom severity	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
4.1 Bulimia nervosa	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5 Binge eating frequency one year following end of treatment or two years since baseline.	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected

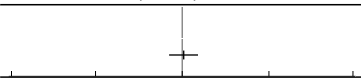
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
5.1 Bulimia nervosa	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

Analysis 4.1. Comparison 4 Specialist inpatient care for bulimia nervosa, binge eating disorder, or other specified feeding or eating disorder (OSFED) bulimia nervosa or binge eating disorder type versus partial hospital care, Outcome 1 Binge eating: frequency.

Study or subgroup	Inpatient care N	Inpatient care Mean(SD)	Partial hospital care N	Partial hospital care Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
4.1.1 Bulimia nervosa						
Zeeck 2009	21	1.1 (1)	22	1.5 (1)		-0.45[-1.04,0.14]

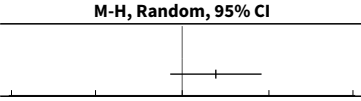
Analysis 4.2. Comparison 4 Specialist inpatient care for bulimia nervosa, binge eating disorder, or other specified feeding or eating disorder (OSFED) bulimia nervosa or binge eating disorder type versus partial hospital care, Outcome 2 Acceptability: number of participants who completed treatment.

Study or subgroup	Inpatient care n/N	Partial hospital care n/N	Risk Ratio M-H, Fixed, 95% CI	Risk Ratio M-H, Fixed, 95% CI
4.2.1 Bulimia nervosa				
Zeeck 2009	18/27	18/28		1.04[0.71,1.52]



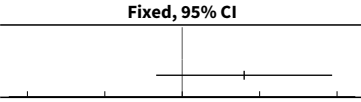
Analysis 4.3. Comparison 4 Specialist inpatient care for bulimia nervosa, binge eating disorder, or other specified feeding or eating disorder (OSFED) bulimia nervosa or binge eating disorder type versus partial hospital care, Outcome 3 Binge eating: abstinence.

Study or subgroup	Inpatient care n/N	Partial hospital care n/N	Risk Ratio M-H, Random, 95% CI	Risk Ratio M-H, Random, 95% CI
4.3.1 Bulimia nervosa				
Zeeck 2009	7/21	3/22		2.44[0.73,8.22]



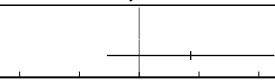
Analysis 4.4. Comparison 4 Specialist inpatient care for bulimia nervosa, binge eating disorder, or other specified feeding or eating disorder (OSFED) bulimia nervosa or binge eating disorder type versus partial hospital care, Outcome 4 General psychiatric symptom severity.

Study or subgroup	Inpatient care N	Inpatient care Mean(SD)	Partial hospital care N	Partial hospital care Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
4.4.1 Bulimia nervosa						
Zeeck 2009	21	0.9 (0.5)	22	0.7 (0.5)		0.2[-0.08,0.48]



Analysis 4.5. Comparison 4 Specialist inpatient care for bulimia nervosa, binge eating disorder, or other specified feeding or eating disorder (OSFED) bulimia nervosa or binge eating disorder type versus partial hospital care, Outcome 5 Binge eating frequency one year following end of treatment or two years since baseline..

Study or subgroup	Inpatient care		Partial hospital care		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Fixed, 95% CI	Fixed, 95% CI
4.5.1 Bulimia nervosa						
Zeeck 2009	21	1.6 (1.3)	22	1.1 (1.1)		0.43[-0.27,1.13]



ADDITIONAL TABLES

Table 1. Comparative components of treatments across different settings

	Inpatient	Partial or day hospital	Outpatient
Anorexia nervosa	Multidisciplinary – medical, nursing, dietetic (refeeding), and psychological care[1]	Multidisciplinary – medical, nursing, dietetic (refeeding), and psychological care	Multidisciplinary – medical, nursing, dietetic (refeeding), and psychological care, OR psychological care incorporating refeeding and other elements, delivered variably
Bulimia nervosa	Multidisciplinary – medical, nursing, dietetic, and psychological care	Multidisciplinary – medical, nursing, dietetic, and psychological care	May be multidisciplinary, but is most usually individual psychotherapy with limited medical care for complications form purging
Binge eating disorder	Multidisciplinary – medical, nursing, dietetic, and psychological care	Multidisciplinary – medical, nursing, dietetic, and psychological care	May be multidisciplinary, but is most usually individual psychotherapy with dietetic care for those with obesity
Other eating disorders	Multidisciplinary – medical, nursing, dietetic, and psychological care	Multidisciplinary – medical, nursing, dietetic, and psychological care	Multidisciplinary – medical, nursing, dietetic, and psychological care, OR psychological care and other elements, delivered variably

[1] Psychological care refers to individual, group, or family psychotherapy. It may be delivered by psychologists, psychiatrists, or clinicians from other disciplines, such as social work, who have specific training in psychological therapies

APPENDICES

Appendix 1. CCMDCTR - core MEDLINE search

Core search strategy used to inform the Cochrane Common Mental Disorders Group's Specialised Register: MEDLINE Ovid
A weekly search alert based on condition + RCT filter only
1. *[MeSH Headings]:*
eating disorders/ or anorexia nervosa/ or binge-eating disorder/ or bulimia nervosa/ or female athlete triad syndrome/ or pica/ or hyperphagia/ or bulimia/ or self-injurious behavior/ or self mutilation/ or suicide/ or suicidal ideation/ or suicide, attempted/ or mood disorders/ or affective disorders, psychotic/ or bipolar disorder/ or cyclothymic disorder/ or depressive disorder/ or depression, postpartum/ or depressive disorder, major/ or depressive disorder, treatment-resistant/ or dysthymic disorder/ or seasonal affective disorder/ or neurotic disorders/ or depression/ or adjustment disorders/ or exp antidepressive agents/ or anxiety disorders/ or agoraphobia/ or neurocirculatory asthenia/ or obsessive-compulsive disorder/ or obsessive hoarding/ or panic disorder/ or phobic disorders/ or stress disorders, traumatic/ or combat disorders/ or stress disorders, post-traumatic/ or stress disorders, traumatic, acute/ or anxiety/ or anxiety, castration/ or koro/ or anxiety, separation/ or panic/ or exp anti-anxiety agents/ or somatoform disorders/ or body dysmorphic disorders/ or conversion disorder/ or hypochondriasis/ or neurasthenia/ or hysteria/ or munchausen syndrome by proxy/ or munchausen syndrome/ or fatigue syndrome, chronic/ or obsessive behavior/ or compulsive behavior/ or behavior, addictive/ or impulse

control disorders/ or firesetting behavior/ or gambling/ or trichotillomania/ or stress, psychological/ or burnout, professional/ or sexual dysfunctions, psychological/ or vaginismus/ or Anhedonia/ or Affective Symptoms/ or *Mental Disorders/

2. *[Title/ Author/ Keywords]:*
(eating disorder* or anorexia nervosa or bulimi* or binge eat* or (self adj (injur* or mutilat*)) or suicide* or suicidal or parasuicid* or mood disorder* or affective disorder* or bipolar i or bipolar ii or (bipolar and (affective or disorder*)) or mania or manic or cyclothymic* or depression or depressive or dysthymi* or neurotic or neurosis or adjustment disorder* or antidepress* or anxiety disorder* or agoraphobia or obsess* or compulsi* or panic or phobi* or ptsd or posttrauma* or post trauma* or combat or somatoform or somati#ation or medical* unexplained or body dysmorphi* or conversion disorder or hypochondria* or neurastheni* or hysteria or munchausen or chronic fatigue* or gambling or trichotillomania or vaginismus or anhedoni* or affective symptoms or mental disorder* or mental health).ti,kf.

3. *[RCT filter]:*
(controlled clinical trial.pt. or randomized controlled trial.pt. or (randomi#ed or randomi#ation).ab,ti. or randomly.ab. or (random* adj3 (administ* or allocat* or assign* or class* or control* or determine* or divide* or distribut* or expose* or fashion or number* or place* or recruit* or subsitut* or treat*)).ab. or placebo*.ab,ti. or drug therapy.fs. or trial.ab,ti. or groups.ab. or (control* adj3 (trial* or study or studies)).ab,ti. or ((singl* or doubl* or tripl* or trebl*) adj3 (blind* or mask* or dummy*)).mp. or clinical trial, phase ii/ or clinical trial, phase iii/ or clinical trial, phase iv/ or randomized controlled trial/ or pragmatic clinical trial/ or (quasi adj (experimental or random*)).ti,ab. or ((waitlist* or wait* list* or treatment as usual or TAU) adj3 (control or group)).ab.)

4. (1 and 2 and 3)

Records were screened for reports of RCTs within the scope of the Cochrane Common Mental Disorders Group to June 2016. Secondary reports of RCTs were tagged to the appropriate study record.
Similar weekly search alerts were also conducted on OVID EMBASE and PsycINFO, using relevant subject headings (controlled vocabularies) and search syntax, appropriate to each resource.

Appendix 2. Review search update 2018

Date of search: Wednesday, 3 July 2018

- CCMD Register (not searched);
- CENTRAL 2018, Issue 6 (date limited, 2015 onwards; N = 1213)
- MEDLINE Ovid (2015 onwards; N = 375)
- Embase Ovid (2015 onwards; N = 727)
- PsycINFO Ovid (2015 onwards; N = 606)

Total = 2921
Duplicates removed = 803
Number to screen = 2118

Search Strategies

1. CENTRAL
Host: Cochrane Library Wiley Interface
Data parameters: Issue 6 of 12, June 2018 (date limited, 2015 onwards)
Search strategy:

#1 MeSH descriptor: [Feeding and Eating Disorders] explode all trees
#2 "eating disorder"
#3 Anorexi*
#4 MeSH descriptor: [Bulimia] this term only
#5 Bulimi*
#6 EDNOS
#7 (binge near/3 eat*)
#8 (#1 or #2 or #3 or #4 or #5 or #6 or #7)
#9 (inpatient* or in-patient* or outpatient* or out-patient* or hospital* or institution* or admission* or admitted or admit or confinement or clinic or clinics or "clincal management" or "clinical support" or specialist or "specialized treatment" or "specialised treatment" or supervi* or "day care" or "day centre*" or "day center*" or "day unit*" or "day treatment*" or "community mental health" or "mental health service*" or residential or referral or referred or "patient care" or (weight and restor*) or feed* or re-feed* or refeed*)
#10 MeSH descriptor: [Patients] this term only
#11 (#9 or #10) (557489)
#12 (#8 and #11) Publication Year from 2015 to 2018 (1448)

2. **MEDLINE Ovid databases (all)**
Data parameters: 1946 to 2 July 2018 (date limited, 2015 onwards)

Search Strategy:

1 exp "FEEDING AND EATING DISORDERS"/
2 (eat* adj3 disorder).ti,ab,kw,ot.
3 Anorexi*.ti,ab,kw,ot.
4 Bulimia/
5 Bulimi*.ti,ab,ot,kw.
6 EDNOS.ti,ab,ot,kw.
7 (binge adj3 eat$).ti,ab,kw,ot.
8 (1 or 2 or 3 or 4 or 5 or 6 or 7)
9 exp Patients/
10 (inpatient* or in-patient* or outpatient* or out-patient* or hospital* or institution* or admission* or admitted or admit or confinement or clinic or clinics or "clincal management" or "clinical support" or specialist or "specialized treatment" or "specialised treatment" or supervi* or "day care" or "day centre*" or "day center*" or "day unit*" or "day treatment*" or "community mental health" or "mental health service*" or residential or referral or referred or "patient care" or (weight and restor*) or feed* or re-feed* or refeed*).ti,ab,kw,ot.
11 (9 or 10)
12 randomized controlled trial.pt.
13 controlled clinical trial.pt.
14 randomized.ab.
15 placebo.ab.
16 clinical trials as topic.sh.
17 randomly.ab.
18 trial.ti.
19 (12 or 13 or 14 or 15 or 16 or 17 or 18)
20 (8 and 11 and 19)
21 (2015* or 2016* or 2017* or 2018*).yr,dt,ed,ep.
22 (20 and 21) (375)

3. **Embase Ovid**
Data parameters: 1974 to 2 July 2018 (date limited, 2015 onwards)
Search Strategy:

1 eating disorder/
2 (eat* adj3 disorder).ti,ab,kw,ot.
3 Anorexi*.ti,ab,kw,ot.
4 Bulimia/
5 Bulimi*.ti,ab,ot,kw.
6 EDNOS.ti,ab,ot,kw.
7 (binge adj3 eat$).ti,ab,kw,ot.
8 (1 or 2 or 3 or 4 or 5 or 6 or 7)
9 (inpatient* or in-patient* or outpatient* or out-patient* or hospital* or institution* or admission* or admitted or admit or confinement or clinic or clinics or "clincal management" or "clinical support" or specialist or "specialized treatment" or "specialised treatment" or supervi* or "day care" or "day centre*" or "day center*" or "day unit*" or "day treatment*" or "community mental health" or "mental health service*" or residential or referral or referred or "patient care" or (weight and restor*) or feed* or re-feed* or refeed*).ti,ab,kw,ot.
10 exp patient/
11 (9 or 10)
12 random$.af.
13 (8 and 11 and 12)
14 (2015* or 2016* or 2017* or 2018*).yr,dd.
15 (13 and 14) (727)

4. **PsycINFO Ovid**
Data parameters: 1967 to June week 4 2018 (date limited, 2015 onwards)

Search Strategy:

1 Eating Disorders/
2 (eat* adj3 disorder).ti,ab.
3 Anorexi*.ti,ab.

4 Bulimia/
5 Bulimi*.ti,ab.
6 EDNOS.ti,ab.
7 (binge adj3 eat$).ti,ab.
8 (1 or 2 or 3 or 4 or 5 or 6 or 7)
9 exp *PATIENTS/
10 (inpatient* or in-patient* or outpatient* or out-patient* or hospital* or institution* or admission* or admitted or admit or confinement or clinic or clinics or "clincal management" or "clinical support" or specialist or "specialized treatment" or "specialised treatment" or supervi* or "day care" or "day centre*" or "day center*" or "day unit*" or "day treatment*" or "community mental health" or "mental health service*" or residential or referral or referred or "patient care" or (weight and restor*) or feed* or re-feed* or refeed*).ti,ab.
11 (9 or 10)
12 (8 and 11)
13 random$.af.
14 (12 and 13)
15 (2015* or 2016* or 2017* or 2018*).yr,an,up.
16 (14 and 15) (606)

5. Trial Registries
5.1. **WHO International Clinical Trials Registry Platform (ICTRP)**
Date: 4 July 2018
Searched via: apps.who.int/trialsearch/Default.aspx
Search strategy:

"anorexia nervosa" or "bulimia" or "eating disorder*"

5.2. **Clinical Trials.gov**
Date: 4 July 2018
searched via: clinicaltrials.gov/ct2/home
Search strategy:

anorexia nervosa or bulimia or eating disorder

Appendix 3. Data extraction form

Trial ID:

Date Form completed:

Other comments:

Extractors initials:

Title			
Author(s)			
Year/reference			
Country/Language			
Diagnosis	DSM	ICD	Other:
Active intervention[1]			
Comparison program or care	1.		
	2.		
	3.		

(Continued)

4.

Interventions:	**Multidisciplinary**	**Evidence-based**	**Incorporating refeeding**
	YES/NO		
Inpatient non-family-based programme			
Inpatient family-based programme			
Outpatient family-based programme			
Partial hospitalisation family-based programme			
Partial hospitalisation family-notbased programme			
Outpatient non-family-based programme			

Selection bias:		
1.Allocation sequence generation	CIRCLE	YES/NO
	Computer generated sequence Random number tables Lot drawing Coin tossing Shuffling cards Throwing dice	Adequate (low risk of bias)
	Case number Date of birth Date of admission Alternation Other (specify)	Inadequate (high risk of bias)
	Not stated	YES/NO
	Adequacy -Circle	YES/NO/UNCLEAR
	Cluster randomised	YES/NO/UNCLEAR

(Continued)

2.Allocation concealment	CIRCLE	YES/NO
	Central, or computerised randomisation (or both) Coded boxes Envelopes: Sealed / Opaque Sequentially numbered	Adequate (low risk of bias)
	Open allocation sequence Procedures based on inadequate generation	*Inadequate (high risk of bias)*
	Adequacy -Circle	YES/NO/UNCLEAR

Performance bias:[2]			
Method - specify			
Effectiveness Methods	Participant	Therapist	Outceo-massessor
Adequate			
Inadequate			
Feasible			
Unfeasible			
Unclear			
NA			
Incomplete data outcome	YES/NO		
Were reasons for attrition or exclusions reported?			
Flow diagram			
	Potentially eligible		
	Excluded before randomisation:		
	Number randomised in each group: Control: Experiment:		
	Post randomised exclusions in each group		
	Number analysed		
	Number analysed at 12-month follow-up		
Attrition	Level		Tick

(Continued)

	Low risk <20%
	Some risk 20-49%
	High risk ≥50%
Analysis	Intention to treat
	Completers (specify)
Follow-up	3 months
	12 months
	Six months
	> 12months
	Other - specify

[1] Describe inpatient programme or care: type of programme and psychotherapies applied, including intensity and number of sessions, if pharmacotherapy was included, and if so, what medications.

[2] Measure used to attempt or ensure blinding of trial participants and key personnel from knowledge of which intervention a participant had received.

Outcome results

		Inpatient group	**Control group**
		event (n) or mean (SD)	**event (n) or mean (SD)**
Primary outcomes			
1	BMI		
2	Binge eating frequency		
3	Global ED symptom score		
4	Weight restoration		
5	Morgan-Russell outcome assessment schedule recovered		
6	No ED behaviour		
7	Binge eating abstinence 1 month		
Secondary outcomes			
1	Quality of life generic		

(Continued)

2	Quality of life ED specific
3	Depression
4	Psychological symptoms general
5	Patient satisfaction
6	Adaptive function
7	Morgan-Russell outcome assessment schedule broad
8	Non-completers (any reason)
9	Non-completers (adverse event)

Subgroup analysis #1

Diagnostic subgroups of eating disorders (ED): anorexia nervosa, bulimia nervosa, and subtypes of eating disorders not otherwise specified (EDNOS)

Anorexia nervosa (AN) only			
		Inpatient **event (n) or mean (SD)**	**Control** **event (n) or mean (SD)**
Primary outcomes			
1	BMI		
3	Global ED symptom score		
4	Weight restoration		
5	Morgan-Russell outcome assessment schedule recovered		
6	No ED behaviour		
Secondary outcomes			
1	Quality of life generic		
2	Quality of life ED specific		
3	Depression		
4	Psychological symptoms general		
5	Patient satisfaction		
6	Adaptive function		

(Continued)

7	Morgan-Russell outcome assessment schedule broad		
8	Non-completers (any reason)		
9	Non-completers (adverse event)		

Bulimia nervosa (BN) only			
		Inpatient	**Control**
		event (n) or mean (SD)	**event (n) or mean (SD)**
Primary outcomes			
2	Binge eating frequency		
3	Global ED symptom score		
6	No ED behaviour		
7	Binge eating abstinence 1 month		
Secondary outcomes			
1	Quality of life generic		
2	Quality of life ED specific		
3	Depression		
4	Psychological symptoms general		
5	Patient satisfaction		
6	Adaptive function		
8	Non-completers (any reason)		
9	Non-completers (adverse event)		

Binge eating disorder (BED) only			
		Inpatient	**Control**
		event (n) or mean (SD)	**event (n) or mean (SD)**
Primary outcomes			
2	Binge eating frequency		

(Continued)

3	Global ED symptom score
6	No ED behaviour
7	Binge eating abstinence 1 month
Secondary outcomes	
1	Quality of life generic
2	Quality of life ED specific
3	Depression
4	Psychological symptoms general
5	Patient satisfaction
6	Adaptive function
8	Non-completers (any reason)
9	Non-completers (adverse event)

Eating disorders not otherwise specified (EDNOS)			
		Inpatient **event (n) or mean (SD)**	**Control** **event (n) or mean (SD)**
Primary outcomes			
1	BMI		
2	Binge eating frequency		
3	Global ED symptom score		
4	Weight restoration		
5	Morgan-Russell outcome assessment schedule recovered		
6	No ED behaviour		
7	Binge eating abstinence 1 month		
Secondary outcomes			
1	Quality of life generic		

(Continued)

2	Quality of life ED specific
3	Depression
4	Psychological symptoms general
5	Patient satisfaction
6	Adaptive function
7	Morgan-Russell outcome assessment schedule broad
8	Non-completers (any reason)
9	Non-completers (adverse event)

Subgroup analysis #2

Children and adolescents versus adults

Children and adolescents			
		Inpatient **event (n) or mean (SD)**	**Control** **event (n) or mean (SD)**
Primary outcomes			
1	BMI		
2	Binge eating frequency		
3	Global ED symptom score		
4	Weight restoration		
5	Morgan-Russell outcome assessment schedule recovered		
6	No ED behaviour		
7	Binge eating abstinence 1 month		
Secondary outcomes			
1	Quality of life generic		
2	Quality of life ED specific		
3	Depression		
4	Psychological symptoms general		

(Continued)

5	Patient satisfaction		
6	Adaptive function		
7	Morgan-Russell outcome assessment schedule broad		
8	Non-completers (any reason)		
9	Non-completers (adverse event)		

Adults

		Inpatient	**Control**
		event (n) or mean (SD)	**event (n) or mean (SD)**
Primary outcomes			
1	BMI		
2	Binge eating frequency		
3	Global ED symptom score		
4	Weight restoration		
5	Morgan-Russell outcome assessment schedule recovered		
6	No ED behaviour		
7	Binge eating abstinence 1 month		
Secondary outcomes			
1	Quality of life generic		
2	Quality of life ED specific		
3	Depression		
4	Psychological symptoms general		
5	Patient satisfaction		
6	Adaptive function		
7	Morgan-Russell outcome assessment schedule broad		
8	Non-completers (any reason)		
9	Non-completers (adverse event)		

Subgroup analysis #3

Family-based versus non-family-based programmes

Family-based programme			
		Inpatient **event (n) or mean (SD)**	**Control** **event (n) or mean (SD)**
Primary outcome			
1	BMI		
2	Binge eating frequency		
3	Global ED symptom score		
4	Weight restoration		
5	Morgan-Russell outcome assessment schedule recovered		
6	No ED behaviour		
7	Binge eating abstinence 1 month		
Secondary outcomes			
1	Quality of life generic		
2	Quality of life ED specific		
3	Depression		
4	Psychological symptoms general		
5	Patient satisfaction		
6	Adaptive function		
7	Morgan-Russell outcome assessment schedule broad		
8	Non-completers (any reason)		
9	Non-completers (adverse event)		
Non-family-based programme			
		Inpatient **event (n) or mean (SD)**	**Control** **event (n) or mean (SD)**
Primary outcomes			
1	BMI		

(Continued)

2	Binge eating frequency
3	Global ED symptom score
4	Weight restoration
5	Morgan-Russell outcome assessment schedule recovered
6	No ED behaviour
7	Binge eating abstinence 1 month
Secondary outcomes	
1	Quality of life generic
2	Quality of life ED specific
3	Depression
4	Psychological symptoms general
5	Patient satisfaction
6	Adaptive function
7	Morgan-Russell outcome assessment schedule broad
8	Non-completers (any reason)
9	Non-completers (adverse event)

WHAT'S NEW

Date	Event	Description
22 January 2019	Amended	Typo corrected in the plain language summary

HISTORY

Protocol first published: Issue 12, 2013
Review first published: Issue 1, 2019

Date	Event	Description
26 August 2014	Amended	Outcome 4 in published protocol changed from depression to "Depression or other psychiatric symptom severity"

Date	Event	Description
		Measured by any validated questionnaire for depression e.g. the Beck Depression Inventory (Beck 1996) or general psychiatric symptoms e.g. the Brief Symptom Inventory (Derogatis 1993).

CONTRIBUTIONS OF AUTHORS

PH is lead author and responsible for all stages of the review. CM is an experienced Cochrane reviewer and assisted with data checking and 'Risk of bias' assessment. SM is a content expert and assisted in trial selection and 'Risk of bias' assessment, data interpretation, and preparation of the final manuscript. Sl is a biostatistician who contributed to the statistical analyses and data interpretation. AC and ST are content experts, and assisted with the design of the review and preparation of the manuscript.

DECLARATIONS OF INTEREST

Phillipa Hay is a co-author of one included trial in this review (Madden 2014), and two reviews that address the topic (RANZCP 2014; Zipfel 2015). Sloane Madden and Stephen Touyz are co-authors of one included trial in this review (Madden 2014), and one review that addresses the topic (RANZCP 2014). These authors were not involved in the data extraction nor the risk of bias assessment of this trial (Madden 2014), this was done independently by other members of the author team.

Phillipa Hay has received funding from Shire Pharmaceutical for a commissioned report (2017) and for teaching/education at a psychiatrists conference (2018) and Stephen Touyz is an advisor for Shire Pharmaceuticals. However, this review is concerning the effects of treatment setting not a named drug treatment that is marketed by Shire Pharmaceuticals.

Angelica Claudino has no known conflicts.

Sanja Lujic has no known conflicts.

Caroline Smith has no known conflicts.

SOURCES OF SUPPORT

Internal sources

- Western Sydney University, University of Sydney, Australia.

External sources

- None, Other.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

No changes were made to the inclusion criteria, and no subgroup analyses were added. In the subgroup analysis by age group, we made a minor change to the definition of children and adolescents from < 17 years to < 18 years.

The outcome data at two-year follow-up was changed from recovery to the primary outcome, as specified for the three eating disorder groups, as we considered this to be more appropriate.

Following statistical peer review, we used a fixed-effect meta-analysis to combine the four studies, since the small number of studies was deemed to be too small for a random-effects model, mainly because the parameter estimates (in particular, the estimate of Tau^2) would likely be imprecise (Borenstein 2007).

Following peer review, we split the outcome that included both depression scores and general psychiatric symptoms, as these measuring different underlying conditions.

We had intended to measure cost-effectiveness, by calculating the incremental cost-effectiveness ratios (ICER). We were unable to calculate ICER, and instead, narratively reported the total cost of care, reported in two of the included studies.

INDEX TERMS

Medical Subject Headings (MeSH)

*Ambulatory Care [statistics & numerical data]; *Hospitalization [statistics & numerical data]; Anorexia Nervosa [*therapy]; Body Mass Index; Body Weight; Bulimia Nervosa [*therapy]; Confidence Intervals; Feeding and Eating Disorders [therapy]; Length of Stay [statistics & numerical data]; Randomized Controlled Trials as Topic; Remission Induction; Waiting Lists

MeSH check words

Adolescent; Adult; Humans; Young Adult