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Cognitive behavioural therapy in relation to treating anorexic patients

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Abstract
Anorexia Nervosa is a type of persistent eating disorder characterised by a low body mass and distortions of beliefs about body shape and weight. By identifying the risk factors of Anorexia Nervosa and comparing the effectiveness of the different treatments available, i.e. Cognitive Behavioural Therapy (CBT), the Maudsley Model of Anorexia Nervosa Treatment for Adults, and Family-based Therapy, this dissertation aims to find out the effectiveness of CBT, a commonly used therapy for AN in many institutions. The findings of this dissertation provide significant evidence that CBT is effective in bringing about positive change in AN patient in terms of a change in perception as well as increasing weight and remittance rate. A few studies indicated that a mix of different therapies promise a higher recovery rate, implying higher effectiveness can be achieved with multiple therapists targeting the interpersonal aspects. Whilst the current research in AN treatment involves a relatively small sample size, future implications are that more research should be conducted with a larger sample size of AN with replication.

Keywords: Anorexia Nervosa, eating disorder, AN patient, cognitive behavioural therapy (CBT)

1. Introduction

1.1 Status quo

Eating disorders have become a more prevalent mental disorder in recent years [1], with 1.25 million people (2%) in the UK [2] and at least 30 million people (9%) in the USA being affected [3, 4]. Among all types of eating disorders, as well as all identified mental disorders, patients of anorexia nervosa are associated with the highest mortality rate. The Standardized Mortality Ratio (SMR) [5] for Anorexia Nervosa is 5.86 [6], which is even higher than that of

[1] Morris J. Rising admissions for eating disorders—we need to close the revolving door of treatment and relapse. The BMJ Opinion. 15 March 2018. Retrieved from https://blogs.bmj.com/bmj/2018/03/15/jane-morris-rising-admissions-for-eating-disorders-we-need-to-close-the-revolving-door-of-treatment-and-relapse/

[2] Number of people with an ED in the UK. Retrieved from https://www.beateatingdisorders.org.uk/how-many-people-eating-disorder-uk

[3] Hudson, J. I., Hiripi, E., Pope Jr, H. G., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. Biological psychiatry, 61(3), 348-358.

[4] Le Grange, D., Swanson, S. A., Crow, S. J., & Merikangas, K. R. (2012). Eating disorder not otherwise specified presentation in the US population. International Journal of Eating Disorders, 45(5), 711-718.

[5] Standardised mortality ratio (SMR) is the ratio between the observed number of deaths in a study population and the number of deaths would be expected. The higher the SMR, the higher the mortality rate.

[6] Arcelus, J., Mitchell, A. J., Wales, J., & Nielsen, S. (2011). Mortality rates in patients with anorexia nervosa and other eating disorders: a meta-analysis of 36 studies. Archives of General Psychiatry, 68(7), 724-731.

substance use disorder at 4.17. [7] It is generally twice as high as other psychiatric disorders and 200 times as high as a typical individual. The age of occurrence of the disorder saw a decreasing trend with more youngsters adversely affected by the disorder. The relapse rate is high among fully recovered patients as well. The most intriguing point is that relapse occurs to 33% of successfully recovered patients who have undergone treatments [8]. This dissertation aims to discuss the cause and risk factors of Anorexia Nervosa in teenage patients, and to compare different types of treatment with Cognitive Behavioural Therapy (CBT), a commonly used approach, to find out the effectiveness of CBT and its implications on treating eating disorders.

According to the International Statistical Classification of Diseases (ICD) used in the UK for patient diagnosis, the symptoms of an individual with AN include restricted dietary choice, excessive exercise, induced vomiting and purgation, and use of appetite suppressants and diuretics. There is usually malnutrition of varying severity with secondary endocrine and metabolic changes and disturbances of bodily function.

As outlined by Professor Christopher Fairburn in the lecture Effective Psychological Treatments, the major treatment for Bulimia Nervosa is CBT. Considering the similarities between AN and BN, the effectiveness of CBT as well as that of other approaches will be compared, including therapies such as the Maudsley Model of Anorexia Nervosa Treatment for Adults (MANTRA) and Family-based therapy (FBT), and applicable medications.

1.2 Definition of terms

1.2.1 The following terms are defined.

1. Eating disorder (ED) refers to an unhealthy attitude to food, which can take over one's life and cause one to become sick. It can involve eating too much or too little, or becoming obsessed with one's weight and body shape. It is the umbrella term for Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorders and Otherwise Specified Feeding and Eating Disorders.
2. Anorexia nervosa (AN) is a disorder characterized by deliberate weight loss, induced and sustained by the patient; associated with a specific psychopathology whereby the over-evaluation of shape and weight persists as an intrusive overvalued idea, and the patients impose a low weight threshold on themselves.
3. Cognitive Behavioural Therapy (CBT) is a type of psychotherapy in which negative patterns of thought about the self and the world are challenged in order to alter unwanted behaviour patterns or treat mood disorders such as depression. In this dissertation, CBT refers to the enhanced version of CBT developed by Dr Christopher Fairburn in 2008, rather than the general CBT model for other psychological disorders.

2. Literature Review

2.1 Application procedures of CBT on AN patients

Fig 1: Conducting CBT session on a teenage patient.

The general structure of delivery of CBT for teenage AN patients is highlighted below [9].

The idea behind is to achieve weight regain in three chronological steps within 30 sessions. First, patients become aware of the need for weight regain and decide to start treatment. After that, patients regain weight to a low but healthy level. Finally, weight maintenance is achieved.

2.1.1 Preparation

In the first appointment, the parents would be asked if they wish to see the teenage patient alone prior to the appointment, and the teenage AN patient would also be asked alone if it was their own choice to attend the session. A higher degree of affirmation and care would be shown - this includes reassuring the patient that the therapist's main concern is their wellbeing rather than that of others, and asking patients if they were truly able to control their eating. Two-way communication is involved in the therapy as the therapist asks the patient to list the advantages and disadvantages of starting a treatment, followed by question-and-answer time for any enquiries from the patient. For example, the therapist would help the patient identify personally salient adverse effects if treatment does not start, but provide the incentive that treatments can be shorter depending on their progress. Parents were then asked in, such that the outline of the treatment can be made understood to both the patient and parents. At this stage, although the parents were asked to discuss the pros and cons together, the decision still belongs to the patient themselves.

In the second appointment, the therapist would review the advantages and disadvantages of starting treatment with the patient alone, leading into the prospect of change as a positive direction. Then, the parents would be invited in, where they would be informed of the decision to start treatment and be explained the importance of their role in the teenage patient's treatment. Whilst the role of the parents is to support the treatment between the therapist and the patient, educating the parents via a 'parents alone' session would be crucial for maximised outcome. The parents would be educated on the nature and maintenance of the child's eating disorder. Since the parents may be new to the disorder, they need to be aware of the importance of a pleasant environment at home as well as the parental barriers to change.

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[7] Chang, C. K., Hayes, R. D., Broadbent, M., Fernandes, A. C., Lee, W., Hotopf, M., & Stewart, R. (2010). All-cause mortality among people with serious mental illness (SMI), substance use disorders, and depressive disorders in southeast London: a cohort study. BMC psychiatry, 10(1), 77.

[8] Carter, J. C., Blackmore, E., Sutandar-Pinnock, K., & Woodside, D. B. (2004). Relapse in anorexia nervosa: a survival analysis. Psychological medicine, 34(4), 671-679.

[9] Fairburn, C. G. (2008). Cognitive behavior therapy and eating disorders. Guilford Press.

2.1.2 Stage 1
After the first two appointments, the CBT officially begins with the first stage. During this stage, patients are encouraged to be active in attempting to change. They are free to make use of visual aids for better understanding and control, while establishing real-time self-monitoring by personal diaries or mobile applications. A personalised education session is also included, where weight concern is addressed with the goal of resuming to regular eating.

2.1.3 Stage 2
During stage two, a goal weight range is being identified for the initiation of weight regain [10]. The weight range cannot be associated with psychosocial features of starvation, and has to be healthy from the physical perspective in the sense that developmental needs are met. A BMI of 19.0 to 20.0 is reasonably adopted. Appropriate guidance should be given regarding the types of food to intake, but should not be so rigid that patients fall back into their rigid eating behaviours. Planning of meal plans is conducted jointly between the therapist and the patient.

In the session, patients learn that they should stop weighing themselves at home but should be weighted at the start of the therapy sessions each week. A weight graph will be plotted after each update, which will later be interpreted by the therapist and patient together.

When patients are at home, they are asked to self-monitor in real time. A positive energy balance of 500 calories should be achieved every day. The specific cognitive behavioural strategies adopted at home range from eating all planned food without being influenced by preoccupations of eating and food, to avoiding rituals on the table and distancing oneself from the thoughts and preoccupations on food.

During the therapy session with parental involvement, parents are also educated about the weight regain process and how they can behave in family meals for the benefit of the patients' recovery. They learn that when the patients encounter difficulty, they should be supportive and encouraging of the patients to make use of what they have learned during the treatment sessions.

2.1.4 Stage 3
Following stage two is a set of 3 modules addressing the maintaining mechanisms of AN, namely the Body Image Module, the Dietary Restraint Module, and the Events, Moods and Eating Module. In the Body Image Module, over-evaluation of shape and weight will be demonstrated by the use of pie charts. Patients come to terms with the fact that social media often promotes body checking and hence comparison with role models of unrealistic standards on social media. The Diet Restraint Module increases patients' awareness that the distancing of patients from their peers would impair their psychosocial relationships with others. At this stage, parents may assist by helping the patient address dietary rules at home in a gradual manner. The final module relates moods triggered by events with eating behaviours, which allows patients to recognise the complex relationship between events, fluctuations in mood and the resultant change in their eating behaviours.

[10] Fairburn, C. G., Cooper, Z., Doll, H. A., O'Connor, M. E., Palmer, R. L., & Dalle Grave, R. (2013). Enhanced cognitive behaviour therapy for adults with anorexia nervosa: A UK–Italy study. Behaviour research and therapy, 51(1), R2-R8.

Finally, weight maintenance is achieved at a goal weight set in the beginning of the treatment, allowing the patients and parents to end well.

2.2 Application of alternative treatments
AN can be treated by certain types of therapy. It has been shown that medicine has limited effect on the treatment of AN, which is supported by the insignificant results from patients treated with medication [11].

2.2.1 The Maudsley Model of Anorexia Nervosa Treatment for Adults (MANTRA)
This specific interpersonal maintenance model suggests that AN typically arises is people with anxious and obsessional characteristics. It is further proposed that AN is maintained by 4 board factors:

1. A rigid, detail-focused and perfectionist information processing style
2. Impairments in socioemotional domain, such as avoidance of the experience and expression of emotions in the context of close relationships
3. Consonant with these impairments, these individuals typically develop beliefs about the use of AN in their lives
4. Close ones may inadvertently maintain AN by high levels of expressed emotion or by accommodation and enabling behaviours [12].

In addition to the 4 factors stated, the starvation behaviour intensifies all of these problems, thus forming a recursive loop between the consequences of starvation and these maintenance factors. This is because starvation inhibits the transmission of dopamine and norepinephrine, two of the important neurotransmitters of which low levels would result in depressed feelings, irritability, and moodiness. This may intensify the problem by increasing the compulsion to gain control of their own lives at the minimal level.

This model is a variation to the classical CBT model which focuses on weight and shape concerns as the centre of the disorder. Treatment based on these models aim to identify the cause of the trigger which leads to the associated behaviour in AN.

2.2.2 Family-based therapy (FBT)
FBT therapists take a different approach from the conventional CBT and do not analyse the eating disorder. The eating disorder is seen as an external force that is negatively impacting the teenager. It presumes the effective connection between parents and patient and empowers the parents to use their love to help their teenager, without inflicting any blame between family members. Parents are viewed as experts on their children and a critical part of the solution, so are asked to join with the healthy part of the teenager against the eating disorder. Full nutrition is involved in the initiation step, so parents provide this nutrition by actively feeding the patient.

FBT sessions usually involve the entire family and include at least one family meal in the therapist's office. This gives

[11] Gorla, K., & Mathews, M. (2005). Pharmacological treatment of eating disorders. Psychiatry (Edgmont), 2(6), 43.

[12] Schmidt, U., & Treasure, J. (2006). Anorexia nervosa: Valued and visible. A cognitive-interpersonal maintenance model and its implications for research and practice. British Journal of Clinical Psychology, 45(3), 343-366.

the therapist an opportunity to observe the behaviours of family members during a meal and to coach the parents to help their child eat. Because patients with eating disorders may present with medical complications, they are monitored by a physician during the course of treatment.

2.2.3 There are 3 phases of FBT

- **Phase 1:** Full parental control. Parents are usually in complete charge of meals as they help their child to re-establish regular patterns of eating and interrupt problematic eating disorder behaviours such as bingeing, purging, and physical exertion. The goal is 1 to 2 pounds per week. The therapist works to empower parents to take on these tasks and helps the parents learn to manage the child at mealtimes.
- **Phase 2:** A gradual return of control to the adolescent. This phase typically begins once weight is mostly restored, when meals are going more smoothly, and when behaviours are more under control. Control is gradually handed back to the adolescent in an age-appropriate manner: for example, the child may start to have some meals or snacks away from the parent. There can be backsliding and parents may have to reassert control from time to time until the adolescent is fully ready; this is part of the process.
- **Phase 3:** Establishing healthy independence. When the adolescent is able to eat with an age-appropriate level of independence and does not exhibit eating disorder behaviours, the focus of treatment shifts to helping them develop a healthy identity and catch up on other developmental issues. Other comorbid problems may be addressed. The family is helped to reorganize now that the child is healthier.

2.2.4 Interpersonal therapy

This type of therapy focuses on overcoming interpersonal difficulties that maintained the eating disorder of a patient. [13].

The main one is that interpersonal difficulties are common in patients with eating disorders and they appear to contribute to their maintenance. These difficulties may predate the eating disorder or they may have a more recent onset and indeed be a consequence of the disorder. Most adults with eating disorders present in their twenties or early thirties and, on average, have suffered from an unremitting eating disorder for 8 years (Fairburn *et al*., 2007). As late adolescence and early adulthood are critical periods for the development of relationships, the eating disorder has often resulted in profound interpersonal disturbance by the time that an individual seeks treatment. For instance, many patients have had limited experience developing and maintaining intimate relationships, partly as a result of social withdrawal that is a common feature of eating disorders but also due to the low self-esteem which often accompanies the disorder.

These interpersonal difficulties appear to contribute to the maintenance of the eating disorder through a variety of mechanisms. First, patients often become more isolated from the normalizing influence of their peers and, as a result, their psychopathology tends to persist unchallenged. Second, certain eating disorder features may be directly maintained by interpersonal difficulties. For example, both binge eating and dietary restraint tend to occur in the context of, or are exacerbated by, adverse interpersonal events. Third, interpersonal difficulties often serve to worsen self-esteem, which in turn tends to increase patients' efforts to control their eating, shape and weight to feel more in control [14].

3. Discussion and Evaluation

3.1 Effectiveness of CBT on Anorexia Nervosa

Research has shown significant effectiveness of CBT on Anorexia Nervosa. Following intensive outpatient CBT, patients' BMI and weight evaluation scores have been recorded. This section aims to present results of CBT in tables and graphs to analyse the effectiveness of CBT in different studies.

Table 2. Treatment outcome in 13 consecutive underweight eating disorder patients completing intensive outpatient CBT-E

	Pre-treatment	Post-treatment	Six-months follow-up	Friedman Test
	1	2	3	
Body Mass Index (kg/m²)	$14.6 \pm 1.5_{2,3}$	$18.2 \pm 1.0_{1}$	$18.1 \pm 1.0_{1}$	15.17***
EDE				
Restraint	$4.0 \pm 1.7_{2}$	$1.0 \pm 1.2_{1}$	2.3 ± 2.1	11.40**
Eating Concern	$3.8 \pm 1.0_{2,3}$	$1.2 \pm 1.1_{1}$	$2.0 \pm 1.5_{1}$	17.89***
Weight Concern	$4.4 \pm 1.4_{2}$	$1.9 \pm 1.7_{1}$	2.3 ± 1.9	12.63**
Shape Concern	4.6 ± 1.5	3.1 ± 2.2	3.3 ± 2.2	3.62
Global Score	$4.2 \pm 1.3_{2}$	$1.8 \pm 1.4_{1}$	2.4 ± 1.9	8.98**
SCL-GSI	$1.8 \pm 0.8_{2,3}$	$0.9 \pm 0.7_{1}$	$0.9 \pm 0.8_{1}$	8.14*

*p < .05 **p < .01 ***p < .001

EDE = Eating Disorder Examination (12.0D); SCL-GSI = Symptom CheckList-90R General Severity Index

Subscripts refer to significant differences between groups measured with Wilcoxon Signed Ranks Test (with Bonferroni correction)

Fig 2: Treatment outcome in 13 consecutive underweight ED patients completing intensive outpatient CBT-E

From the table above, the BMI of patients before the treatment was 14.6, which is considered underweight. After the treatment, their BMI has increased to normal levels, recording 18.2 and 18.1 post-treatment and six months after treatment respectively, with a standard deviation of 1.0 which indicates that the spread is small and hence results are consistent across the patients. The fact that the six-month follow-up measurement for BMI is a 0.1 nominal decrease indicates that their weight has only decreased by 0.55% compared to their post-treatment weight, implying that a relapse has not happened in the six-month period.

In addition, the global score of the eating disorder examination, consisting of restraint, eating, weight and shape concerns, have decreased from 4.2 pre-treatment to 1.8 post-treatment. This suggests that there is a significant effect on resolving the patients' thoughts and preoccupation on eating and shape. However, the six-month follow-up score has increased to 2.4 with a larger standard deviation of 1.9, which indicates that there are potentially scores of 4.3, which is slightly higher than the pre-treatment score suggesting it is possible for some patients to have an increased score 6 months after the treatment. The same trend can be observed in the individual components - restraint, eating, weight and shape concerns, which all saw a decrease in score post-treatment but underwent a slight rebounce to a higher score six months after treatment. This is especially

[13]Murphy, R., Straebler, S., Basden, S., Cooper, Z., & Fairburn, C. G. (2012). Interpersonal psychotherapy for eating disorders. Clinical psychology & psychotherapy, 19(2), 150-158.

[14]Fairburn, C. G., Cooper, Z., Doll, H. A., O'Connor, M. E., Palmer, R. L., & Dalle Grave, R. (2013). Enhanced cognitive behaviour therapy for adults with anorexia nervosa: A UK–Italy study. Behaviour research and therapy, 51(1), R2-R8.

prominent in their restraint score, which saw a 1.3 times increase from 1.0 to 2.3. However, given that their initial restraint score was 4.0, a score of 2.3 is still an improvement from the pre-treatment history, providing evidence that the extent of restraint has still reduced.

The Friedman test has been carried out in a significance level of 1% in the global score and 0.1% for the BMI, which implies that the results are strictly significant.

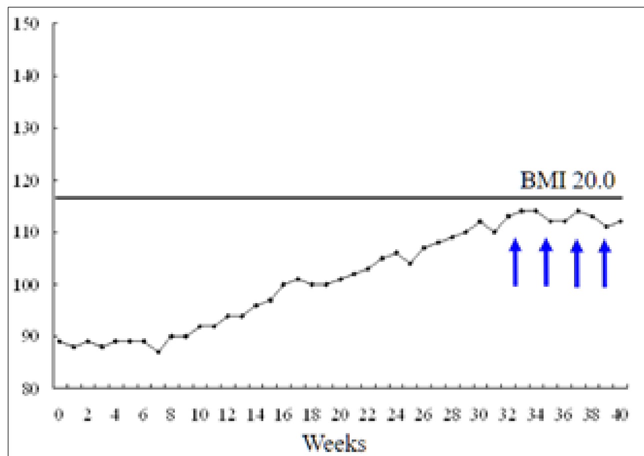

Fig 3: Change in AN patients' mean weight over the course of CBT treatment

From the broken line graph above, it can be observed that there is an overall trend of increase in weight across the 30-40 week programme. The patients start off with a mean weight of 90 pounds, which translates into a BMI of 15.3. The gradual rise in weight began at 12 weeks into the programme, in which the weight of patients rose consistently until week 30, when they have finally achieved a BMI of normal levels. From week 30 to 40, it can be seen that the BMI remains constant overall at a level near BMI 20.0, which is a commendable achievement throughout the course of therapy. The maintenance of weight also implies that relapse has not happened in a 10-week period, providing further evidence that CBT is effective in treating AN.

In a 2015 replicated study of using CBT in the treatment of AN [15], there were also promising results. 29 adolescents and 32 the adults completed all 40 sessions of treatment, where significantly more adolescents reached the goal BMI than adults (65.3% and 36.5% respectively). The mean time required by the adolescents to restore body weight was 14.8 weeks, which was 15 weeks less than that for the adults. The consistent results in this study suggests that the results are replicable and ecologically valid.

3.2 Effectiveness of alternative treatments

3.2.1 Mantra

The treatments reaped significant improvements in BMI and reductions in eating disorders symptomatology, distress levels, and clinical impairment over time, with no statistically significant difference between groups at either 6 or 12 months [16]. It was found that full recovery has occurred to 13 of 72 patients (18.1%); partial recovery has occurred to 36 out of 72 patients (50%); and 9 out of 72 (12.5%) did not recover. MANTRA patients rated their treatment as significantly more acceptable and credible at 12 months than other specialised clinical management.

3.2.2 FBT

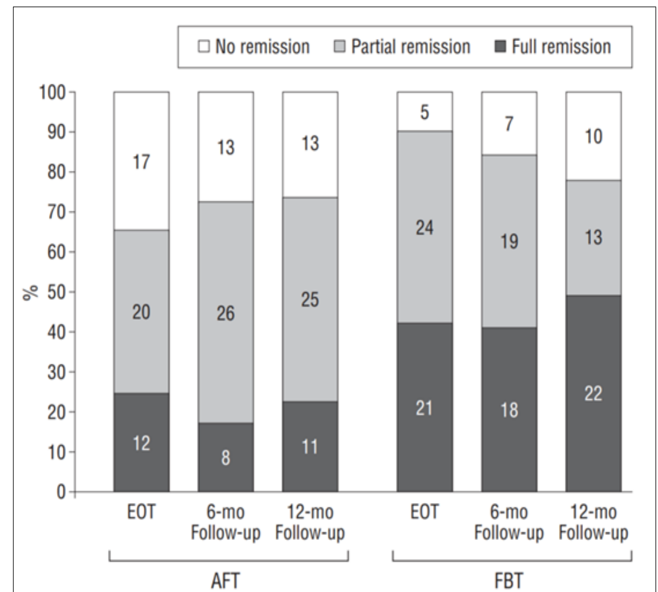

Fig 4: Observed partial and full remission rates by treatment assignment (end of treatment [EOT]: adolescent-focused individual therapy [AFT], n =49; family-based treatment [FBT], n = 47; FBT, n = 44; and 12-month follow-up: AFT, n = 49; FBT, n = 45).

From the bar chart above, it can be seen that FBT recorded 42% of full remission and 48% of partial remission at the end of treatment, with 10% of patients not being remitted. The 6-month follow-up data shows that 36% of patients were fully remitted and 38% were partially remitted. By 1 year, the full remission rate increased to 44% and partial remission was only 26%. From the overall trend, it can be observed that the full remission has increased over time but there was also a doubled number of patients by the end of 1 year not being remitted. This shows that there is moderate effectiveness by using FBT to treat teenage AN patients.

3.2.3 IPT

[15]Calugi, S., Dalle Grave, R., Sartirana, M., & Fairburn, C. G. (2015). Time to restore body weight in adults and adolescents receiving cognitive behaviour therapy for anorexia nervosa. Journal of eating disorders, 3(1), 21.

[16]Schmidt, U., Magill, N., Renwick, B., Keyes, A., Kenyon, M., Dejong, H., & Watson, C. (2015). The Maudsley Outpatient Study of Treatments for Anorexia Nervosa and Related Conditions (MOSAIC): Comparison of the Maudsley Model of Anorexia Nervosa Treatment for Adults (MANTRA) with specialist supportive clinical management (SSCM) in outpatients with broadly defined anorexia nervosa: A randomized controlled trial. Journal of consulting and clinical psychology, 83(4), 796.

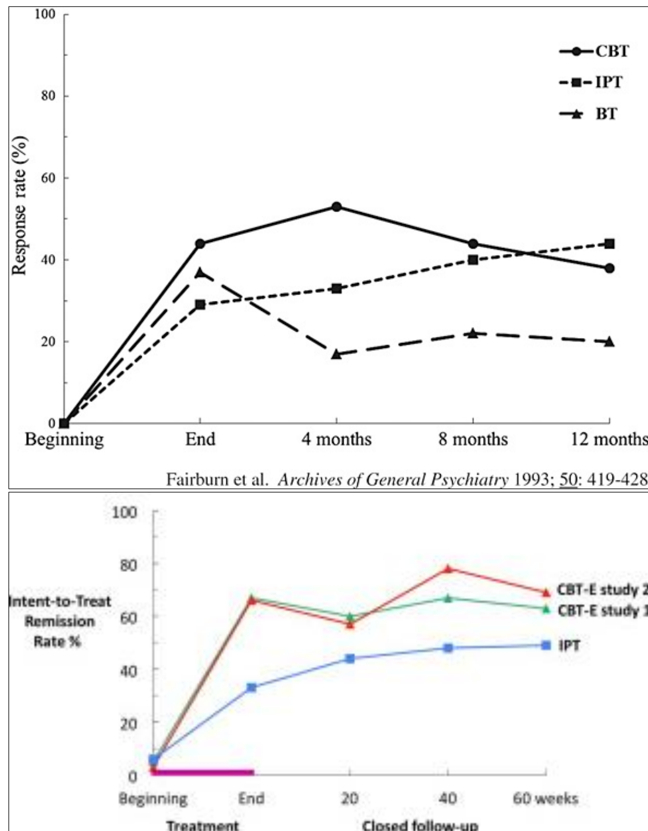

Fig 5: Response to cognitive behaviour therapy (CBT-E) or interpersonal Psychotherapy (IPT)

The response to IPT had similar results across different replications with slight variations. From the graph on the left, it was found that the CBT had a higher response rate overall, but IPT slightly outperformed CBT at around 10 months, resulting in the former therapy having a higher response rate the 12-month assessment with a difference of 5%. From the line graph on the right, it can be seen that the intent-to-treat remission rate has been highly led by CBT across all timestamps in the 60-week period. CBT recorded over 60% of remission rate in both studies. IPT, on the other hand, had a more gradual increase and finished with 40% remission rate.

3.3 Reduction of risk factors

Identifying the risk factors for AN and comparing these with the treatment objectives would allow better understanding and analysis of how each therapy targets the characteristics of AN, hence evaluating the effectiveness of each therapy and understanding why some therapies result in a greater extent of improvement than others.

The risk factors accounting for AN are divided into three major perspectives: cognitive, social and biological. Cognitive risk factors focus on cognitive flexibility and perception; social risk factors focus on family systems, peer interaction and learning; biological risk factors focus on genetic predisposition and neurochemical imbalance.

From the cognitive aspect, most patients of AN have cognitive distortions of body shape and weight. Murphy *et al*. (2010) argued that all other clinical features of AN stems from the distortions [17] and this has been supported by the Body Image Assessment [18]. Irrational beliefs and attitudes also give rise to perfectionism which is prevalent in AN patients. The lack of cognitive flexibility explains AN using set-shifting [19] in the cognitive interpersonal maintenance model of anorexia. When the AN patient engages in weight loss, they are rigid in persisting the process without being able to bring the behaviour to a halt despite an issue that no longer exists.

From the social aspect, AN patients may have experienced elements present in a typical anorexic family - enmeshment, overprotectiveness, rigidity and conflict avoidance [20]. Members of the family can be overly involved without clear boundaries of self-identities with one another, with parental figures of the family being overly protective towards the adolescents. The rigidity of the family resists change of habits, which transforms into a weakness when environmental circumstances change. In addition to the above factors, the family avoids conflicts, in which many would rather suppress thoughts than to talk through the situation due to fear of speaking up and potentially creating a conflicting scenario.

From the biological aspect, AN has a genetic and neural basis. AN concordance rate was found to be 56% in monozygotic twins but only 32% in dizygotic twins [21], which suggests that genetics play a role in AN. Candidate genes have also been identified. A candidate-gene association study compared 1205 and 1918 AN and control participants respectively by sequencing 152 candidate genes and found that the gene epoxide hydrolase (Ephx2) codes for an enzyme for cholesterol metabolism. However, in a genome-wide association study, it was found that the genes identified were not significantly related to AN. This is also supported by the fact that comorbidity exists, meaning that AN is not determined by a single gene exclusive to other psychological disorders. In terms of the neural explanation, underactivity of neurotransmitters dopamine and serotonin gives rise to the disorder.

Summarising from the above risk factors for AN, it can be deduced that the main contributory factors to AN are cognitive and social. This explains why therapies are adopted in a cognitive and social approach, instead of heavily relying on medications, unlike other psychological disorders such as major depressive disorder or OCD. Medications may be used but the objective is to alleviate the associated symptoms of AN, such as lowered moods [22] and insomnia [23].

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[17] Murphy, R., Straebler, S., Cooper, Z., & Fairburn, C. G. (2010). Cognitive behavioral therapy for eating disorders. Psychiatric Clinics, 33(3), 611-627.

[18] Veron-guidry, S., Williamson, D. A., & Netemeyer, R. G. (1997). Structural modeling analysis of body dysphoria and eating disorder symptoms in preadolescent girls. Eating Disorders, 5(1), 15-27.

[19] Treasure, J., & Schmidt, U. (2013). The cognitive-interpersonal maintenance model of anorexia nervosa revisited: a summary of the evidence for cognitive, socio-emotional and interpersonal predisposing and perpetuating factors. Journal of eating disorders, 1(1), 13.

[20] Minuchin, P. (1985). Families and individual development: Provocations from the field of family therapy. Child development, 289-302.

[21] Treasure, J., & Holland, A. (1995). Genetic factors in eating disorders. Handbook of eating disorders: Theory, treatment and research, 65-81.

[22] Eckert, E. D., Goldberg, S. C., Halmi, K. A., Casper, R. C., & Davis, J. M. (1982). Depression in anorexia nervosa. Psychological Medicine, 12(1), 115-122.

[23] Crisp, A. H., Stonehill, E., & Fenton, G. W. (1971). The relationship between sleep, nutrition and mood: a study of patients

3.4 Strengths of CBT and its research

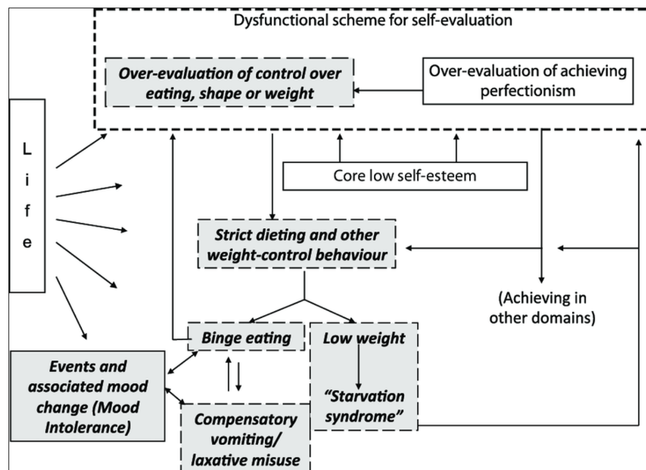

Fig 6: The enhanced transdiagnostic cognitive behavioural theory (Fairburn)

The main success of using CBT in treating AN is because of its holistic approach to cater to the intrapersonal and interpersonal aspects of the behaviour, whilst assisting the patient to regain and maintain weight when solving those issues. It covers multiple perspectives of the same disorder, with a strong link between life events, change of mood and coping mechanism of undereating. Since the CBT treatment addresses most of the associated issues of AN through examining the validity of patients thoughts and engaging the patient to participate actively in the process with visual tools and real time self-monitoring, the effectiveness of the therapy increases.

In addition, the involvement of parents in the treatment is also crucial. The parents act as a supporting role to the whole treatment, with appropriate understanding of how the treatment works both in the therapy session and at home. The support from parents from home aids the real-time self-monitoring of the patients, and allows the cultivation of an ED-friendly home environment which benefits the patients in their recovery. Even though parents are involved, the patients still actively engage in the therapy and are the centre of the therapy, which is more humanistic than some other therapies such as IPT where the patient engagement is very low.

3.5 Limitations of CBT and its research

A limitation of CBT research is that a lot of patients are recruited via advertisements [24] which results in voluntary sampling of participants. This is an issue because the results can be biased due to the tendency that patients would participate in a study only if they were confident that they would end with positive outcomes, an issue associated with social desirability bias. In the real world situation, CBT outcomes may be less secure than they are displayed in studies.

Another limitation is that the sample size of CBT research is quite small. For CBT treatment in AN patients, the sample size is often below 100 per study, due to various factors such as setting controlled variables to ensure that the results are valid, which vastly decreases the number of patients in each study. In addition, some patients may drop out in the middle of the CBT treatment, resulting in a much smaller sample at the end of the study. With small sample size in studies, hypothesis testing should be carried out with a strict significance level to ensure that the results are valid. Further issues with population validity may arise because a small sample size may not be representative of the full picture of its effectiveness in other patients.

4. Conclusion and future implication

To conclude, CBT is effective in treating teenage Anorexia Nervosa patients to a large extent, due to its holistic nature in addressing multiple aspects of the patients' behaviour and cognition. In the future, studies on CBT for Anorexia can be done with a larger sample size, and may pair up with other therapies to see the complementary effect of utilising multiple therapies in maximising recovery outcomes. With the effectiveness in CBT, more psychological and medical institutions should adopt the same therapy approach for suitable teenage patients.

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