EFFICACY OF FAMILY-BASED TREATMENT FOR ANOROXIA NERVOSA IN ADOLESENCE

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ABSTRACT

Anorexia Nervosa (AN) has the highest mortality rate of psychiatric disorders compared to others that nearly 10% to 20% patients die by aged 20 (Katzman, 2005). AN arises in the adolescence and is a considerable disorder that needs treatment. There are certain types of psychological interventions for adolescent AN one of them is Family-based therapy (FBT). Family treatments which address the eating disorder can be offered to adolescents with AN (National Collaborating Centre for Mental Health, 2004). Although, some empirical-based studies show that it might be effective using family-based treatments for AN in Adolescence some reviews like Cochrane review Fisher, Hetrick, & Rushford (2010) found no superior effect on family-based therapy in AN.

The current study aims to examine the efficacy of Family-based treatment in AN. Seven studies looking at the efficacy of family-based treatment for adolescent AN were identified using databases such as BMC Psychiatry, Taylor & Francis, Informaworld, NCBI includes PubMed and Wiley Online Library.

The results of this study found that family-based therapy is promising adaptation of AN, and feasible and acceptable for use in young adults (Dimitropoulos et al., 2018). Lock et al. (2015) founds it is acceptable to use adaptive treatment like Intensive Parental Coaching (IPC) to improve feasibility of FBT. Multi-family therapy (MFT) is effective as single-family therapy (SFT). MFT in adolescent AN found less costly and more effective compare to SFT however, it is not significant at the follow-up (Eisler et al., 2016; Carrot et al., 2019). Overall, family-based treatments are effective intervention for adolescent AN but not effective in the long-term. Therefore, FBT therapies need to be longer, and researchers need to make more follow-up sessions with a higher sample size.

Keywords: Anorexia Nervosa (AN), Eating Disorders, Adolescence, Young people, Treatment, Effective Treatment, Family-Based Therapy, Multi-family therapy, Maudsley Family Therapy

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INTRODUCTION

"The syndrome of anorexia nervosa is associated with characteristic dysfunctional patterns of family interaction. The family therapist conceptualizes anorexia nervosa in relation to the organization and functioning of the entire family . . . and plans the therapeutic interventions to induce change in the family" (Sargent et al., 1985, p. 278).

Anorexia Nervosa

Eating Disorders involve extreme anxiety and worry towards the shape of your body or weight that could cause significant psychological and physical impairment especially when an individual develops in adolescence (Couturier, Kimber, & Szatmari, 2012). Eating disorders include Anorexia Nervosa (AN), Bulimia Nervosa (BN), Binge Eating Disorder, other specified eating disorders (American Psychiatric Assosiation,2013). AN is a significant disorder that often emerges by aged 17 (Hurst, Read, & Wallis, 2012). The mortality rate of AN is high in mental illness that 5.6% of people with AN die per decade. (Sullivan, 1995; Herzog, Nussbaum, & Marmor, 1996). The definition of AN is excessive fear for gaining weight and disrupted body image that leads individual diet and restriction behaviours like extreme exercise or purge. Besides, emotion and cognition function are significantly damaged in individuals who have AN (Zipfel, Giel, Bulik, Hay, & Schmidt, 2015).

The criteria of AN in Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-5) (American Psychiatric Association, 2013) is: (A) energy intake restriction which leads to considerable low body weight in relation to sex, age, physical health and developmental path (American Psychiatric Association, 2013). (B) Extreme fear of gaining weight or getting fat or even they are significantly low weight, having persistent behaviour that interferes with weight gain. (C) Disturbance about how body shape or weight are experienced, the extreme

impact of body shape or weight on self-evaluation or not recognizing serious situation about their low body weight. Anorexia Nervosa consists of two subtypes which are restricting type and Binge-eating or purging type. Restricting type is when the individuals are not binge eating or purging such as self-induced vomit or improperly using diuretics, laxatives and enemas. Restricting subtypes defines the symptoms in a way which weight loss made firstly from extreme exercise, diet and fasting (APA, 2013). The second subtype of AN is Binge-eating or purging type who engages in repetitive episodes for binge eating or purge behaviour such as, using laxatives, diuretics or enemas and self-induces vomiting. Anorexia Nervosa level of severity comprises four levels based on Body-mass index (BMI) classified by DSM-5 (APA, 2013). These criteria of four levels use individuals BMI which are extreme BMI level (BMI <15 kg/ m^2), severe (BMI 15-15.99 kg/ m^2), moderate (BMI 16-16.9 kg/ m^2) and mild (BMI ≥ 17 Kg /m^2) (APA, 2013).

Epidemiology of Anorexia Nervosa

Anorexia Nervosa can arise at any age, but generally, it emerges early-to mid-adolescence (Herpertz-Dahlmann, 2009). Over the last century, AN prevalence is estimated at 0.3%, developing mostly in females who are ages 15 and 24 years (Hoek, 2006). The sex ratio is 1:8 in more females, but in children, it can be less skewed (Steinhausen & Jensen, 2015). The mortality rate is lower in adolescent compare to adults that mean mortality is 2% to 5% (Steinhausen, 2002). Individual diagnosed with Anorexia Nervosa have some psychiatric and physical comorbidity. Between 25% and 75% patients have a history of anxiety disorder occurring before AN in childhood. (Swinbourne & Touyz, 2007). Whereas because of Anorexia Nervosa obsessions and compulsion are experienced in 79% (Salbach-Andrae et al., 2008) and obsessive-compulsive disorder arises for AN individual between 15 to 29% (Halmi et al., 2003).

There are some factors that impacts Anorexia Nervosa such as genetic, neurobiological, developmental and environmental factors (Zipfel, Giel, Bulik, Hay, & Schmidt, 2015). Heritability of AN is between 28% to 74% (Bulik, Yilmaz, & Hardaway, 2015), and there is no specific gene for AN (Boraska et al., 2014). For neurobiological factors, during childhood, there are some temperament and personality traits like obsession, perfectionism and anxiety which are risk factors for AN (Kaye, Wierenga, Bailer, Simmons, & Bischoff-Grethe, 2013). Developmental factors like prenatal and perinatal cases and sleep or feeding adversities in infancy develop AN (Tenconi, Santonastaso, Monaco, & Favaro, 2015; Jacobi, Hayward, Zwaan, Kraemer, & Agras, 2004). There are environmental factors that risk for developing AN. Firstly, females are more at risk to develop AN (Jacobi et al., 2004). Urbanisation and living in the industrial world create a risk factor for AN (Smink, Hoeken, & Hoek, 2012). However, there are risk factors most of the deaths for AN because of suicide or initial physical problems of AN for instance, cardiac problems (Herzog et al., 2000). In summary, these results highlight that effective treatments are needed for the AN during adolescence. This may help prevent relapse of AN disorder, and it might decrease mortality the rate.

There are certain treatments for Anorexia Nervosa, but for adolescents, there are limited therapies compared to adults. Adolescent Anorexia Nervosa treatments are: Cognitive Behavioural therapy, family-based interventions which include, Maudsley family therapy, multi-family and single-family therapy. Parent-focused therapy is also included in family-based treatments. Maudsley Family Therapy is different than other treatments because it develops specifically for AN and based on traits of AN (Zipfel et al., 2015).

Maudsley Family-Based Therapy

Hurst, Read, & Wallis (2012) claimed that for adolescent Anorexia nervosa, most efficient and promising treatment is Maudsley Family Based Treatment (MBFT). This therapy sees family as a main source of improvement and helping parents to manage adolescent AN behaviour quicker. The therapy based on a different type of family therapy approaches such as strategical, structured, narrative and Milan systemic approaches (Lock et al., 2001). The main problem in MBFT for AN is adolescents fall back to their developmental stage and do not show the normal adolescent behaviour like playing or having eating pattern because of the presence of AN (Hurst, Read, & Wallis, 2012). Narrative techniques use for externalize the problem so that eating disorder is seen as the source of the problem, rather than the fault of the individual. This theory aims to change the parent's perception of not judging their children (White& Epston,1990). MBFT underlines for parents that they need to support their child and work collaboratively to beat the Anorexia Nervosa. In structural family therapy, parents and adolescents have to have clear boundaries for a healthy relationship (Minuchin et al., 1975). The family meal is an important intervention used in the second session of the MBFT. The meal intervention aims to create a healthy boundary and authority for children with their eating. Milan systematic family goals to weight gain and normal eating based on, this the therapist shows to family questioning techniques that beneficial for weight gain.

MBFT is an intense therapy that comprises three phases. The therapy is an outpatient therapy conducted across 20 to 24 sessions over nearly 12 months. The goal of the first phase is refeeding the patient and aim to weight restoration and back to normal eating. This goal is done by a focus on severe malnutrition related to AN and coach parents about refusal eating and firming the eating by adequately warning the child (Lock et al., 2001). Besides, in

the phase one the other main aim is getting other siblings to help and encourage their sibling with AN. The phase two theme is creating a novel pattern of relationship. In this phase the therapist encourages parents to assist their adolescent in being more control of eating. This is accomplished by negotiation over more than one periods of the time in adolescent responsible with her/him self-eating. If the adolescent serves her meal and eat particular meals without help and weight gain continues, the treatment can pass to phase three (Hurst, Read, & Wallis, 2012). The aims of phase three is adolescent issues and therapeutic endings. This focuses on the effect that anorexia had on the adolescent and adolescent healthy identity (Lock et al.,2001). In this stage, adolescents have normal weight and self-starvation is reduced. The core aim of phase three is to encourage normal adolescent development like having normal weight according to their age, develop relationships with others or independent eating is discussed. The therapist and family encourage the adolescent to have personal autonomy and autonomy in the termination of the sessions, investigate family experiences through the sessions and give encouragement for future issues (Hurst, Read, & Wallis, 2012). There are some difficulties in practice when applying a MBFT. Firstly, AN is a severe disorder, and the length of the therapy is long. The family can have fatigue for daily difficulties, so the therapist should motivate the family and give hope. Secondly, adolescents who are individualize herself prior to anorexia have some challenges in MBFT, adolescents might have self-autonomy which worries family when they can't control their child at mealtimes (Hurst, Read, & Wallis, 2012). The significant challenge is when the child does not gain weight. Lastly, single-parent families have more limited resources compared to both parents who can make MBFCT more challenging for these families. Despite these difficulties, MBFCT has shown significant treatment in adolescent AN (Hurst, Read, & Wallis, 2012).

Multi-Family Therapy for Anorexia Nervosa in Adolescence

Multifamily therapy (MFT) treats some families together. It also called multifamily group therapy (Voulgari & Eisler, 2016). MFT has similar stages to family-based therapy. However, there are some differences. The therapy includes five or seven families who have adolescents with AN, the course is 9 months with a 1-6 day follow up. The MFT focuses on self-efficacy in the family and expanding their knowledge to help their adolescent. The context of MBFT Is learning and sharing others' experiences of AN. Also, adding additional perspectives and accepting other family's ideas. Group therapy gives the advantage of reducing stigma, and they feel like others share the same difficulties. Similarly, with Family-focused therapy, MFT treatment aims to change AN behaviour with the effort of family to encourage their children to change their eating pattern. (Voulgari & Eisler, 2016). In MFT, some phases are similar to FBT, but there are some differences. In phase one, the therapist creates engagement and the therapeutic relationship (Eisler, 2005). The therapist tries to listen to all family members to learn symptomology of the eating problems. In the second phase of MFT, families share their AN experience that arise a supportive environment. Adolescents are joining multi family dinners, role plays about a meal like changing the roles between adolescents and parents to gain insights into eating behaviour (Eisler, 2005). In phase three of MFT, the therapist uses group techniques such as, imagine adolescents are 20 years old and they are writing for future self, how they get better in AN and what are the changes in their life. In phase four, finishing the sessions. In this stage, some parents want feedback about the sessions (Eisler, 2005). In MFT, there are some problems when finishing the group sessions such as, it is the families, not therapist, that take responsibilities in their life and recovery. The MFT group create a goodbye session that parents and adolescents do

on their own. The end of group sessions is not always the end of therapy- some families could need additional family-based therapy (Eisler, 2005).

Prior Studies in Family-based treatment for Anorexia Nervosa in Adolescence

In the prior literature, there are some discrepancies for the effectiveness of family-based therapy in AN for adolescence. Fisher, Hetrick, & Rushford (2010) conducted a Cochrane review looking at the efficacy of family therapy in AN compare to other therapies. The study examines the efficacy of different types of family therapy in AN. Overall, the study examined 13 articles. The eight articles of RCT looks efficacy of FBT compared to non-family treatment, and the six articles provide remission of the symptoms of AN in the sessions and remission of the follow-up sessions. The study compares Family-therapy and treatment as usual (TAU) across 13 studies. The review includes postintervention studies, short term studies which are lower than 12 months follow up and long-term studies which are higher than 12 months. The review compares the efficacy between the long-term and short term of the studies. Crisp (1991) and Dare (2001) found that there was a significant rise in remission of AN symptoms in participants who are in family therapy. Dare (2001) also found there was no statistically significant outcome in family therapy compare to TAU after 12 months follow up. The result showed family therapy was more effective than treatment as usual but not in the long term.

In Russel (1987) study, the review separates three subgroups according to their duration of AN. Subgroup 1 is adolescents who are AN illness less than 3 years and age are less than 18. Subgroup 2 is adolescents who are longer duration of AN. Subgroup 3 are adults who are AN and older than 19 years old. They found there was no remission following family therapy or psychological therapy for subgroup 3. In the subgroup 1 of the Russel (1987) study who are

less than 18 years old and have illness less than 3 years results are significant rise who experience a remission in family therapy than a group of individual supportive therapy. This significant increase for remission remained in 5-year follow-up. The study of Fisher, Hetrick, & Rushford (2010) also compared conjoint family therapy and separated family therapy with the studies of Eisler (2000) and Le Grange (1992). They found no significant differences between two types of therapy, nearly 60% to 80% participant weight gain, which was more than their Ideal Body Weight (IBW) and families in Separated family therapy. Substantially, the review of Fisher, Hetrick, & Rushford (2010) did not find evidence for superiority in family therapy in regard to remission compared to psychological interventions. There is an only significant advantage for certain family therapy for adolescent is that long-term family therapy is more improve the remission of AN compare to short-term therapy, still it does not continue in follow up. According to the Cochrane review, family-therapy has no superiority over other treatments for AN in adolescence.

Hurst, Read, & Wallis (2012) examined the study of Lock et al. (2010), which includes 121 participants and compares MFBT and active treatment of adolescent focused therapy. The goals of this study are to look ego deficits related to AN help to the client to accept their emotions and terminate the starvation. The results of the Lock et al. (2010) study is there was no considerable difference for remission in treatment groups; there was 42% remission rate for MBFT and 23% for AFT, but MBFT indicates better results in the 6- and 12-months follow-up sessions. For partial remission, MBFCT was superior compared to AFT but not in the follow up (Lock et al., 2010). The study results showed MBFT increased client physical health more than individual therapy.

Krautter & Lock (2004) claimed that manualized MBFT is effective and accepted by 78% of clients and families. Although some studies found evidence for the efficacy of family treatments in AN for adolescent (Hurst, Read, & Wallis, 2012), the recent Cochrane review (Fisher, Hetrick, & Rushford, 2010) found no superiority in family therapy over other types of therapy. Overall, there are particularly see that superiority family-based therapy for anorexia nervosa in adolescence over other treatments are not known. Even though certain studies have empirically evidence that they reduce symptoms, this does not continue in the follow-up sessions. There are also other methodological limitations like number of participants are low, there are different thresholds in outcome or criteria, and some therapies are not manualized (Hurst, Read, & Wallis, 2012). The current study aims to review the recent literature looking at the efficacy of family-based treatment for Anorexia Nervosa in adolescence. There are old reviews about family-based treatment for adolescent AN (Fisher, Hetrick, & Rushford, 2010; Hurst, Read, & Wallis, 2012) and there are well-evidenced studies for adolescent AN (Russel, 1987; Lock et al., 2010). This literature review will focus on more up to date studies and examine the efficacy of Family-based treatment, specifically in adolescent AN.

CRITICAL REVIEW

Selection of Studies

Empirically supported and well-designed studies were chosen carefully. The studies centred on the efficacy of family-based treatment for Anorexia Nervosa in Adolescence. The following databases were used when finding studies: ScienceDirect, JMIR Publications, BMC, BMC Psychiatry, Taylor & Francis Informaworld, NCBI (including PubMed) and Wiley Online Library. Articles were selected if they were published between 2015 to 2019. The search of articles involved these terms, “RCT” which is randomized control trials for well quality of studies, “A Pilot study”, “Anorexia Nervosa” or “AN”, “Eating Disorders”, “Psychological interventions”, “Family-based treatment”, “Family Therapy”, “Parent-based Therapy”, “ Children”, “Adolescence”, “Young People”, “effect” or “efficacy of family-based treatment”.

For this search, other eating disorders, AN in adults, and other treatments for Anorexia Nervosa were excluded. Out of 22 studies, 7 studies were selected. Pilot studies and quantitative empirical studies looking at family-based treatment for AN in adolescents were included. Consequently, seven studies related to family-based treatment for Anorexia Nervosa in adolescence are included in this literature review.

The studies were included according to certain criteria which are firstly, participant meets the Diagnostic Statistical Manual of Mental Disorders-5 (DSM-5) (APA, 2003) and earlier versions eating disorder criteria for Anorexia Nervosa, or there is a risk for being AN. They identified a risk factor by using a questionnaire such as EDE-Q. Secondly, participants in the studies have to be adolescent or young people who are aged between 11-20 years. Thirdly,

studies involve family-based therapy or multi-family, single-family studies. Overall, seven studies are reviewed and discussed.

Generally, Anorexia Nervosa in Adolescence literature reviews claims that family-based treatment is the evidence-based treatment for AN. The present literature review aims to examine the efficacy of Family-based treatment for Anorexia Nervosa in Adolescence.

Parent Focused and Family-based Treatment for Adolescent AN

Grange et al. (2016). Grange and colleagues (2016) compared the efficacy between Parent-focused Treatment (PFT) and Family-based treatment (FBT) for Anorexia Nervosa in adolescence. Previous Randomised Control Trials (RCTs) looking at a family focused treatment for adolescents AN included all the family members and found promising outcomes; Le Grange et al. (1992) and Eisler et al. (2000) found that adolescents whose family were critical did not get good results from single family therapy (SFT) and conjoint family therapy (CFT). The study claimed that SFT has more effective therapy than CFT. In light of these findings, this study aims to investigate whether parent-based treatments are as effective as a conjoint treatment. The study compares the effectiveness of family and parent-based treatment (PFT). In PFT, the therapist sees only parents in therapy, meanwhile, a nurse monitors the client. (Grange et al., 2016).

Method

In this study participants were 107 adolescents aged between 12 to 18 years who meet the criteria of DSM IV (APA, 2000) for AN. Participants were randomized to receive PFT or FBT. Participants have to live with at least one parent to take on the therapy sessions, and they have to have a sixth grade English proficiency level (Grange et al., 2016). Randomization was matched by the severity of the eating disorder, which is low or high. High severity described

as is smaller than 80, and the duration of the disorder is longer than 12 months. Adolescents were assessed at the end of treatment and post treatment sessions between 6 to 12 months. In the assessment part, interviews are done with parents and adolescents at the end of treatment (EOT) and 6 -12 post-treatment. Questionnaires were done by weekly after three-month sessions and each assessment. The primary outcome is alleviation in symptoms determined by global eating disorder examination (EDE) finds out severe eating disorder. Several measurement tools used for results: Yale-Brown-Cornell Eating Disorder Scale (YBC-EDS) (Mazure, Halmi, Sunday, Romano & Einhorn, 1994) Child Depression Inventory (CDI) (Kovacks, 1992), Children's Yale-Brown Obsessive-Compulsive Scale (CY-BOCS) (Scahill et al., 1997), Parents Versus Anorexia (PVA) (Rhodes, Baillie, Brown, & Madden, 2005) and Family Environment Scale (FES) (Moos & Moos, 1986). Therapy Suitability and Patient Expectancy (TSPE) (Magaña et al., 1986).

Intervention process

The treatment process for both study interventions included 18 outpatient sessions over 6 months. The study took place in the tertiary public hospital as part of the paediatric eating disorder programme. One therapist carried out the therapy for FBT and one therapist and nurse for PFT. FBT involved all the family members and comprised of three phases (Grange et al., 2016). Parent-focused treatment is a version of an FBT but different in some ways; the structure is the same with the FBT, but sessions are managed without contact with the adolescent and siblings. There is no family meal session in PFT.

Primary Findings

In the EOT, reduction ratio in EDE score, which measures the severity of symptoms in AN and median body mass index (mBMI) was considerably higher; 43.1% for PFT compared to FBT 21.8%. PFT 39.2% and FBT 21.8% in 6 months follow up, so the reduction of difference is likewise higher in PFT than FBT. Despite this is not a statistically significant result. Besides, 12 months follow up, they found that there is no difference between PFT and FBT reduction rate (Grange et al., 2016). Moreover, adolescents who have high EDE scores (which corresponds to severe eating disorder pathology) were remission in the duration of illness. On the other hand, adolescents who have obsession-compulsion related to an eating disorder have better results in FBT. Adolescents who have a low score in obsession-compulsion have better results in PFT. In high expectation treatment outcome, which was measured by TSPE (Magaña et al., 1986) to learn expectancy of treatment success for adolescents 6-month follow-up, there was high reduce of PFT rather than FBT. Further, adolescents with a short period of illness have better outcomes 12 months follow up FBT but longer duration Anorexia Nervosa disorder better in PFT.

Strengths and Limitations

Grange et al. (2016) have some strengths. Therapists are specially trained for family-based treatment for adolescents. There was professional supervision for the therapists. There are manualized therapies, and the study has a large sample size. The other strength of this study is using independent assessors for outcomes, and in the treatment, attrition and drop-out rates are very low. Furthermore, there are limitations for this study, the generalizability of findings is low because expert treatment program study site and loss of 12 months follow up data sessions. Further, different remission rate for FBT in EOT for other studies. In Australian

research, they found % 22 remission rates about weight and EDE scores in present RCT and second Australian based study remission rates 22% based on weight and EDE scores (Madden et al., 2014). On the contrary, the US study found %42 (Lock et al., 2010). These differences have perhaps arisen because of the demographic difference between the US and Australian healthcare. Consequently, the investigation of mediators which are potential benefits of PFT and FBT and predictors superiority effect between two therapy are not fit the multiple comparisons. In the future, they need to find and develop more treatment types for family-based interventions.

Jacobi et al. (2018) RCT study aims to investigate the efficacy of a parent-based, and web-based indicated prevention treatment compared with the wait-list control group. Some interventions have been found to decrease the risk of AN incidence for adult (Hay, Claudino, Touyz, & Elbaky, 2015), but the evidence is mixed, and most studies find no effect of follow up. However, family-oriented treatments are advice by (APA, 2013), and are said to prevent the risk of disorder in adolescents. The study hypothesises that when parents of AN adolescents participated in the treatment, this would decrease the main symptoms of AN like weight loss, too much evaluation of body shape and weight, and restrictive eating habit. The low weight is a risk factor for early symptoms for AN and by using parent-based intervention, this study aims to reduce AN symptom in adolescents at risk for AN. (Jacobi et al., 2018).

Method

The study conducted RCT involving parents and their daughters recruited from School in Germany. Eligible participants were assigned either E@T programme, which is web-based preventive program called Eltern als Therapeuten to reduce the risk factor for AN symptoms

or waitlist control (Jacobi et al., 2018). Participants consist of girls aged between 11 and 17 years old who have met criteria for being at risk of AN through screening results, criteria are: eating, shape and high weight worries and urge for being thin measured with Weight Concerns Scale (Grund,2003) and Eating Disorder Inventory (EDI-2) (Paul & Thiel, 2005). The sample comprised adolescent girls (n=1562) and inclusion criteria are 3 main criteria of risk factors. Exclusion criteria were meeting full criteria of eating disorder in the last six months, depression, substance abuse and suicidal thoughts. The procedure of the study involved recruitment made by 86 schools: High risk girls were determined by screen, questionnaires were completed by children with some questions filled by parents (girl's weight, height, family history for eating disorder and lost weight in past 6 months).

Interview results were examined, and parents and children were randomly selected for E@T treatment or only control group. Interventions contain discussion group based on Web, feedback of girls eating and concerns of weight gain. Girls completed self-reports about the treatment process. In a statistical analysis conducted with intention to treat analysis which involves randomized participants. Overall, analyses made with intention-to-treat (ITT) analyses involves all participants. Besides, intervention and the control group differences between them are primary outcomes measured by EBW, concerns about weight and shape. Secondary outcomes measured by using a mixed effect model.

Primary Findings

There was one significant difference found between the intervention and control group. In the previous intervention and 12-month follow-up (FU), parents who are in the intervention group daughters were gain considerable and fast weight indicated alters in expected body weight (EBW) which measured objectively by at the end of the treatment compare to control

group. The maximum effect of treatment in EBW is during the observation. On the contrary, a web-based study not found a difference in BMI. Because of parent's unwillingness to participate in the study, there are limited findings in this RCT. The reasons for parents not attempt as following: (a) they do not see any risk factor for intervention (b) they did not have time for intervention (c) parents report the paediatrician did not see risk (d) parents were afraid of girl's situation getting worse. Because of these reasons, the small amount of parent involves the study, and there is no effect in intention to treat analysis.

Strengths and Limitations

The study of Jacobi et al. (2018) has some strengths, which adds new information for AN literature which is novel research about adolescent AN. The limitations of the study are: (a) the study has a small sample size because low completing screen rate led to reduced power. (b) low amount of suitable participant attended the intervention. (c) Drop-out is high, which impacts the power of the study and outcome analyse for this research. Although the assessment found risk factor, parents were not willing to participate in the, and only %16 of them randomized to take part. In the future studies needs to consider the issue of commitment with the study and parent engagement is essential. Although some limitations, parent-based intervention illustrates some promising finding for adolescents of parents willing to join assessments.

The results of this research are contradicting with Grange et al. (2016) research because Jacobi et al. (2018) found that parent-based therapy was not very promising for a risk factor in children. Still on the other hand, Grange et al. (2016) study found parent-based treatment is effective for AN in adolescence. This may be due to low parent participation; if parent

participates in the intervention and drop-out rate is low, the results might be promising for reducing adolescent AN in high risk girls.

Wallis et al.'s (2017) longitudinal study investigated family-function and parent relationship quality from members of multiple families with adolescents who have severe AN. Adolescents not stable in their assessment medically, accepted for inpatient care and receiving FBT therapy, were compared with the non-clinical group. Unlike Grange et al. (2016) and Jacobi et al. (2018), this study also looked at the effect of relationship quality between adolescent and family. The study has three aims, making a comparison between adolescent, mother and father in the anorexia nervosa group and non-clinical group (NC). The study hypothesised that compared with the NC group, adolescent in the AN group would have lower parent relationship quality and more deterioration of family functioning. Secondly, the study hypothesises that AN group family member would have higher pre-existed impairment of clinical cut-offs which is health and maintenance behaviour than NC. Thirdly, the study expects to find there is less agreement with their worse relationship quality for adolescent and parents in AN group than NC group. On the contrary, it expected that mother and fathers have an agreement in both groups. It is assumed that rising relationship quality could enhance for AN but stay NC group (Wallis et al., 2017).

Method

The participants were 54 Female adolescents with AN. 49 age and gender matched controls who have no eating disorder were also recruited (Wallis et al., 2017). The participants ages between 12-18.5. The study uses from the previous RCT, which are inpatient but adds their own sample which are outpatient (Madden et al., 2015). Participants fulfil the criteria of DSM 4th edition criteria of AN (APA, 2000). Participants were considered

medically unstable during the disorder which had not lasted more than 3 years. Also, no participants received family-based therapy before the RCT. Participants were not excluded from a medical or comorbid psychiatric disorder. RCT participant who was involved in this study completed 20 sessions of FBT and assessment. The NC group was recruited in secondary school from three Australian Schools.

There are two groups of AN, the first group were inpatient, and the second group were outpatient which assessed with manualized FBT and a second assessment made after 6 months with 20 sessions of FBT. At the same time, the NC group were reassessed 14 months from the baseline of AN after the initial assessment. The outcome for the study was measured by Family assessment device (FAD) (Epstein et al.,1983) which measures family model functioning filled by both adolescents and parents and Adolescent attachment relationship quality with their parents (IPPA-45). The questionnaire completed by adolescent and measured attachment and relationship between adolescent and parent (Armsden & Greenberg, 1987).

Primary Outcomes

According to FAD scales, there are no significant percentages of group differences at baseline between AN group of mother and father (Wallis et al., 2017). Both have a poor function in three subscales such as general functioning, problems solving, and behavioural control compare to NC group. In agreement between family members, there were no found differences either group but only NC group fathers poor on problem solving. For adolescent, both AN and NC group less agree with their mother than fathers. AN group reported poor functioning for an agreement with their mothers in communication, affective responsiveness and behavioural control (Wallis et al., 2017). AN father reported poor function in

communication and behavioural control. Nc groups are similarly showing poor function for mothers than father but differently show low function in general function (Wallis et al., 2017).

The study findings show parent communication and adolescent relationship with their parents impacts FBT based treatment; adolescent who has impairment in their relationship are likely to cut-off the FBT treatment. It is similar to Jacobi et al. (2018) study found that parent involvement is fundamental for FBT treatment. In their study, there is no participation for the parent-based treatment. This is the limitation of study which cause to find FBT is no effective treatment. When we compare both Jacobi et al. (2018) and Wallis et al. (2017) studies results we concluded, the participation of parents and family relationship quality is important for effective FBT.

Strengths and Limitations

The Wallis et al. (2017) study has some strengths in that it involves both mother and fathers' reports, and NC group reports compare with AN group so that this type of comparison has not been done before. Likewise, this study design is longitudinal design which ensures recent information regarding to adolescent and parents' responses in time. Further, this study uses manualized FBT and fidelity of treatment was accepted by researchers the early RCT study (Madden et al., 2015). In addition, this study has some limitations, the rate of recruitment is low in the NC group, so AN prevalence in community samples might influence this. The other limitation for this study is although, observing family dynamics in a direct way is more reliable outcomes, the study relies on self-report measurements. On the other hand, the measures which were used have high validity and have been used before in eating disorder studies that contribute reliable data.

Feasibility of Family-based therapy in Anorexia Nervosa

Dimitropoulos et al. (2018) and colleagues conducted pilot research for an open trial manualized adaptation in Family-based Treatment in Transition Age Youth (FBT-TAY) for anorexia nervosa. There are primary and secondary aims of this study. The first aim is the assessment of acceptability and feasibility of manualized model in FBT that fit with TAY for paediatric expert programmes. The second aim is estimation of the clinical effect in FBT-TAY, where the first result is eating disorder symptom reduction and the secondary outcome is weight restoration. Dimitropoulos and colleagues hypothesized that Family-based treatment in transition age youth could decrease eating behaviours measured by Eating Disorder Examination Questionnaire (EDEQ). Also, weight restoration would improve at the end of the treatment (EOT) and follow up that continues 3 months (Dimitropoulos et al., 2018).

Methods

The study of Dimitropoulos et al. (2018) conducted in three hospitals in Canada. One hospital provided adult eating disorder intervention and the other two have paediatric eating disorder programs. 26 participants were recruited from the hospitals. Treatment as Usual (TAU) in three hospitals aims to promote weight gain and decrease eating disorder behaviours like restrict from eating, exercise and binge eating. Toronto Hospital gives intense between 4 to 6 weeks day hospital treatment and between 4 to 6 months inpatient treatment for patients who have eating disorders who are aged over 17 years. The programme of the therapy uses principles of CBT and DBT. If the patients require their family, the programme involves the family, but this is not obligatory. In contrast, New York Hospital gives an intense outpatient programme for adolescent ages 12 to 19. This programme is based on FBT principles and gives day hospital or outpatient FBT therapy. The

main focus of the programme is family treatment. The third hospital gives intense therapy for adolescent eating disorders- the age maximum is 18. The hospital has an inpatient program which prioritises medical stabilization, and an outpatient programme using FBT which also includes art therapy, group therapy and CBT (Dimitropoulos et al., 2018).

In all three hospitals, the participants were recruited while assessments were done in eating disorder programs. The participants were assessed by psychologists/ psychiatrists for eligibility in this study. Participants were recruited according to diagnostic criteria of AN, aged between 16 to 25, were medically stable to receive outpatient therapy and had family members who were willing to take part in FBT. There are exclusion criteria for this study such as a history of previous FBT, suicidal attempts, unstable medically, current violence in the family, substance abuse and psychosis. The assessment used DSM-5 (APA,2013) criteria and participant chose which family members they wanted in the treatment process. FBT-TAY included 25 sessions and frequency of sessions differed across hospitals, but sessions were weekly or bi-monthly.

This study measures feasibility and acceptability of treatment, eating disorder behaviour and weight restoration. Feasibility and acceptability of FBT-TAY were measured in three ways; firstly, how well the therapist kept to the fidelity of the model and attendance of participants. Secondly, acceptance of FBT-TAY compared with TAU. Thirdly, how many participants completed treatment. Moreover, eating disorder behaviour was assessed EOT and three months follow-up. The study used EDE-Q, which measures shape, weight, eat concern (Fairburn & Beglin, 1994). Weight Restoration was described by the percentage of Median Body Mass Index (MBMI) (Centres for Disease Control and Prevention, 2009). Weight was recorded every session of FBT-TAY.

Primary Outcomes

The study found that FBT-TAY is acceptable for therapist, TAY and families. The outcome of FBT-TAY was significant decreases in EDE-Q scores in EOT and three months follow up. There were differences in terms of when people's weight increased. FBT-TAY are significantly increase weight gain starts with EOT and three months follow-up. The participants who complete the treatment achieved weight restoration in EOT but some participants weight decrease in three-month follow-up. The study findings suggest constant family support for TAY while follow up is necessary to assist recovery time. The study's primary finding was that adolescent who collaborates with their parents after inpatient. A treatment has benefit in terms of weight gain and lower EDE-Q scores for involving parents in their treatment.

Strengths and Limitations

The Dimitropoulos et al. (2018) study has some strengths. The study highlights a fundamental progression in the use of FBT-TAY is a beneficial treatment for adolescent with AN. The study took place in multiple hospitals, including paediatric and adult. This increases real world application because participant experience in the therapy happens in different settings. The treatment of the study was manualised, and therapists in the study took careful training. The study also gave supervision for the therapist to provide fidelity of the model. Besides, for strengthen the study, intention to treat analysis was done. This decreases the probability of false positive rates by including those who completed or withdraw in the study. Further, there are limitations of the study that should be considered when interpreting the outcomes. There is a high relapse of AN because of high relapse rate a three-month follow-up is not enough to get a clear estimation of treatment returns. Nevertheless, the pilot study aims to assess the feasibility and primary and secondary results

for FBT-TAY. The other limitation is in the follow-up, weight is based on self-report. There is a chance that participants could overrate their weight which would not reflect accurate results. Thirdly, sample size of this study is modest. The final limitation is therapist supervised for the monitor to adherence to the FBT model, in the future studies, it could be used fidelity forms for assessed bias for the model from the therapist, adolescent and family (Dimitropoulos et al., 2018).

Lock et al. (2015) study examined the feasibility and impact of a new adaptable treatment, intensive parental coaching (IPC). The goal is improving self-efficacy of parents and their refeeding ability who are not good at the early response of FBT. This study develops a new three session therapy suitable alongside FBT called IPC, which includes vivo coaching. The second aim of the study was to collect initial data looking at the treatment effect of IPC as a part of FBT in prior poor responders. Therefore, this study looks at alterations in self-efficacy of parents for FBT and combinations of FBT with IPC (Lock et al., 2015).

Method

The participants of the study were 45 adolescents who are ages between 12 to 18 years old, met with the criteria of DSM IV (APA, 2000) for AN and were living with their family. Therefore, participants who were medically stable for outpatient treatment were recruited in the study. Although some studies did not involve comorbid psychiatric condition and psychotropic medication users, this study recruited these participants if they met the criteria and were taking a stable dose of medication for at least eight weeks. These participants were randomized as 10 participants for standard FBT and 35 participants for an adaptive arm. The study compared feasibility and acceptability in randomised groups (FBT versus FBT/IPC). The study measures the following; rates of attrition and recruitment, weight and

height, therapy suitable or not and therapy suitability and patient's expectancy (TSPE) which is both parental and patient's expectancy about the therapy. The eating disorder expectancy measured with a scale of EDE (Cooper & Fairburn, 1987), and adolescent obsession about their weight measured by children's Yale-Brown Obsessive-Compulsive Scale (Goodman et al., 1989). In this study, they used two treatment types. First, FBT, which comprises 3 phases- the first phase aims to involve the individual with ED in the family meal. The second phase is weight restriction with family helping to support weight gain. In the third phase, the patient has a healthy weight and reduce starvation behaviour. The second treatment was IPC which is a novel treatment similar to FBT and gives three extra sessions of normal FBT. This treatment aims to provide coaching for mealtime for a family's child if they do not gain 2.3 kg by the fourth session of FBT. These sessions aim to modify behaviours that interfere with weights restoration and change the parent's behaviours for supporting weight gain (Lock et al., 2015).

Primary Outcomes

The outcomes of the study illustrate that using an adaptive treatment in multisite RCT is feasible for families who have FBT for adolescent AN. Both groups (FBT, FBT/IPC) had similar weight gain results. The study compares three groups of participants which are AN adolescent, poor responder of FBT and not get IPC have different results with regards to weight gain in EOT with big effect size. Poor responders who received IPC and FBT/ IPC + group rates of weight restoration are 58.3%. There was no difference in attrition between randomised FBT and FBT/IPC (Lock et al., 2015). Further, just global EDE results differed between groups. This suggests that IPC raises weight results, but they have a small impact on eating psychopathology. Nevertheless, additional IPC aims to increase self-efficacy with

IPC score, and after eight sessions, there was no difference with self-efficacy between poor responders and good responders. The study concluded that earlier responders engage with parental self-efficacy, poor early responders of FBT/IPC are engaging parents' self-efficacy more later.

Strengths and Limitations

The study has some strengths and limitations. The strength of the study is showing additional treatment for AN adolescent who receives FBT and has a poor response in terms of weight gain. The study combines FBT and IPC to restore adolescent weight gain. The limitation of this study is using a modest sample size. They need to use larger sample size for feasibility and confirm the primary results of the study. Furthermore, due to using not balanced randomization procedure and increased data in the experimental adaptive treatment, outcome of comparisons across groups impacts are questionable. Although, the study used a comparison group with similar randomised participants from the same research gives benefit for adaptive treatment not the same as true randomise comparison. To sum up, data in this study provides initial support for acceptability and feasibility for treating participants with adaptive family treatment for AN adolescent who not gain any weight in the fourth session of FBT.

Lock et al. (2015) compare both IPC and FBT treatments which are similar, but IPC just has additional sessions with family and AN adolescent who are not gaining weight in FBT by the fourth session. They found that IPC, which is adaptable and feasible in adolescent AN who are not weight gain in the fourth session of FBT but not have significant difference than FBT. Likewise, Dimitropoulos et al. (2018) found similar that FBT-TAY is feasible for adolescent

AN. This suggests that based on both studies' findings, family-based therapies are feasible and acceptable for the adolescent with AN.

Multi-family therapy and Single-family Therapy for AN in Adolescence

The RCT study of **Eisler et al. (2016)** investigates the effectiveness of Multi-family therapy in AN (MFT-AN) compared to Family Therapy in AN (FT-AN). This study is the first RCT study that compares the efficacy of MFT-AN and FT-AN. In prior years there have been fundamental progress for adolescent AN treatment, but there are still gaps in the literature. Besides, family-based therapy is the evidenced therapy for adolescence AN, although many studies comparing family-based therapy, this RCT of Eisler et al. (2016) hypothesised that MFT-AN could be more effective compared to FT-AN for improving nutrition to a healthy condition. The second hypothesis of this study was that MFT-AN could give more satisfactory treatment results compared with FT-AN (Eisler et al., 2016).

Methods

The methods of the study were pragmatic and multicentre RCT with superiority comparing outpatient eating disorder. Two groups were received either multifamily therapy or single-family therapy in adolescent AN. The study recruited 169 adolescents aged between 13 to 20 years who had a DSM-IV (APA, 2000) diagnosis of AN. The participants had to be under 86% median in BMI by sex and age to take part, or in the last three months, participants need to lose 15% of body weight. The participants were randomised to two treatments groups by computer generated blocks to provide equal numbers in the groups. The participants who were independent assessors and blind to the allocation, filled the evaluations in three phases (3 months, end of treatment corresponds 12 months and 18 months). There are two treatment groups: outpatient family therapy and multi-family

therapy. In family therapy for adolescent AN, the patient received therapy with their family for 12 months. Therapy goal were understanding family context, helping parents organize their meals, psychoeducation to understand impact of starvation and use different techniques. For instance, psychoeducation about impacts of starvation. Also, narrative externalizing technique gives idea that anorexia is separate from the individual. This technique discussed about psychological and physiological effects of starvation (Eisler et al., 2016). Multi-family therapy has similar core concept and principles as FBT-AN. However, it is an intense treatment and lets each family support other family members in the group. The therapy starts with 5-7 families for 4 days of intense therapy, and later they have six one day meeting in 4-8 week over nine months. If they needed individual family meetings done by between the group meetings in 12 months for each family. Multi-family therapy goals are to decrease stigma and isolation, create new perspectives, gives novel family context for understanding each other, using cross-family exercise they strengthen their feedback and support between families, practising new behaviours for each other's like, eating behaviour and increase their expectation for recover their AN.

For assessment, the study used a Morgan/Russel global outcome scale as the primary outcome (Russel et al., 1987). For secondary outcomes, they used weight data for BMI, Morgan Russel Scale at 18 months (Russel et al., 1987), and the Eating Disorder Examination for the psychopathology of AN at 12 and 18 months (Fairburn et al., 1993). In addition, at the end of the treatment, all of the participants filled out client satisfaction questionnaire (Attkisson et al., 1982).

Primary Outcomes

The core finding of Eisler et al. (2016) study is, although both treatments are clinically significant, FT-AN group achieved %60 outcome in beneficence of the therapy at the end of the treatment while, MFT-AN group achieved 75% in beneficence of the therapy measured by Morgan Russel scale (Russel et al., 1987). MFT-AN group was significantly different from FT-AN at the end of treatment of 12 months. On the contrary, in the 18 months follow-up, there were no significant differences between groups. 8 of the participants shows bulimic symptoms at EOT. It is not surprising that AN in the recovery can change as a Bulimia Nervosa. In this study, it is a small participant but most of the AN participant symptom change temporarily into Bulimia Nervosa (Eisler et al., 2016). In client satisfaction inventory, the study predicts MFT would be rated as more satisfactory compared to SFT., but study not found, on the contrary, the study found a difference in rating of parents and young people in both treatments. Parental satisfaction was significantly higher than young person satisfaction and the difference between parental and young person satisfaction higher in MFT-AN than FT-AN. The parents were extremely satisfied with the treatments. However, young people were only moderately satisfied with the treatments (Eisler et al., 2016).

Strengths and Limitations

The study has some strengths and limitations. The study of Eisler et al. (2016) is the largest RCT for adolescent AN, with only the adolescent who needs urgent hospitalization excluded. The study, therefore, strongly represents the clinical population of adolescent AN. The design of the study is pragmatic, which corresponds to treatment can be represented specialist community services in the UK. For example, the therapist not recruited for this study, but the therapist received extra training and supervision that treatment is coherent

with the treatment manual. The training provides evidence-based therapy (Eisler et al., 2016). Besides the strengths of the study, there are limitations of the study that needs to be considered. The sample size recruited for this study was close to the study required by a power calculation. On the contrary, the secondary outcomes data lower than except, which is problematic in comparations of outcomes. This situation lowers the power of the study that needs to be noticed. Further, in MFT-AN therapy given in a group of families which they have not collect sufficient information for analysis. The study did not wait for this includes the variable of data for MFT-AN group. The other limitation of this study is the funding of study is limited by six-month follow-up after the treatments have done, but for study outcomes, they need to be long-term follow up for long-lasting results for both treatments (Eisler et al., 2016).

Carrot et al. (2019) study investigated the application of Multi-family therapy in more than one disciplinary treatment program who are adolescent with AN, to see whether it is as effective as single-family therapy (SFT) with regards to Body Mass Index (BMI) at 12 months following the beginning of the treatment. The study objectives were: firstly, the study looks at whether the MFT program for an adolescent who has AN is as effective as SFT after 12 months. They look at clinical evaluation and outcomes like weight, symptoms of an eating disorder, family relations, obsession and depression about their body, and satisfaction with treatments rated by both parents and patients. Secondly, the study looks at the cost of the application for both treatments. Thirdly, the study identifies probable preferential indications for both MFT and SFT therapy to help evaluate evolution in AN for physical, psychological and social. Fourthly, the study aims to test superiority between MT AND SFT. Lastly, to look at differences at follow-up 6 months after the end of the treatment (Carrot et al., 2019). The hypothesis of the study is MFT is as clinically effective as SFT. In addition, MFT

is hypothesised to have cost efficacy and be accepted by both patients and parents. Further, there will be differences in patient fit- some of them fit more in SFT, whereas some of them would fit in MFT (Carrot et al., 2019).

Methods

Carrot et al.'s (2019) multi-centre randomised control trial compares SFT and MFT efficacy, in terms of raising patients BMI after 12 months treatment and 18 months follow-up. The study duration is 4 years, but participant duration is 18 months. The study recruited 150 patients who have met the inclusion criteria, which were: having diagnosis of AN or other eating disorders in DSM-5 (APA,2006) and not otherwise specialised (EDNOS). Participants were aged 13 to 19 years old, diagnosed before the age of 19. Further, participants needed to utilize social program and live with their family (Carrot et al., 2019). Participants were excluded who have psychotic state, brain disorder, a methanolic problem with eating like diabetes, not speak fluent French, or who had already received family therapy. The patients and their families received SFT or MFT. They were seen for therapy in outpatients after inpatient treatment. Inpatients are seen therapy later the half of hospitalization when they are clinically stable outpatients therapy starts (Carrot et al., 2019).

Furthermore, in the interventions, treatment as usual involved understanding the consequence of starving, symptomology of AN and family relations. In systemic single-family therapy, patients, parents and siblings over age 6 are involved. The therapy aims to make therapeutic alliance, create boundaries and strengthen parental authority, teach parents to improve their skills that adapt to alterations with their adolescent. In Multi-family therapy (MFT), the therapy sessions include 5 to 7 families. The therapy consist of the Cook-Darzens approach that elements of the Maudsley approach (Cook-Darzens et al., 2005). The themes

of MFT are family management of AN, emphasizing relationship with family, and get over personal isolation and changing perspectives. The study uses these tests to find outcomes; Morgan Russel Global Assessment Scale (Morgan & Russel ,1975), Eating disorder Inventory to assess eating disorder (binge eating, Bulimia Nervosa, Anoroxia Nervosa) (Garner & Olmstead, Polivy, 1983). They measure Body Image with the body image psychological inflexibility scale (BIPIS) (Callaghan et al., 2015). The study also measures depression and anxiety and Obsessive-compulsive symptomology. Cost calculation between the two therapies was done by questionnaire using semi-structured interview about hospitalization, interventions and outpatient treatment and medications cost for a family in the treatment.

Primary Outcomes

The study by Carrot et al. (2019) found that Multi-family therapy is not a small effect compared to Single-family therapy in mean change in BMI for 12 months follow-up and between the groups. There were no significant differences between MFT and SFT in terms of effectiveness. This result suggests that MFT is as effective as SFT. The other primary outcome of the study was that Multi-family therapy was found to be superior for both satisfaction in treatment and cost-effectiveness compared to SFT. MFT has promising results about satisfaction with the treatment, efficacy and prevention of relapse. On the other hand, the definition of probable preferential indications for both therapies might help to increase therapeutic indications for AN adolescent this contributes early intervention that creates good results (Carrot et al., 2019).

Strengths and Limitations

The study has significant strengths is that the treatment has been manualised which is more controlled and predictable (Carrot et al., 2019). Also, an experienced psychologist and psychiatrist give MFT and SFT therapy. Alongside the efficacy of results, the study investigated the cost-efficacy of treatments. The other strength is the study exclusion, and inclusion criteria were wide making the study more realistic. The study provides a sample that is representative of the health-care system. Furthermore, there are also some limitations to the study. 150 patients and families recruited in a limited time. The study aims to carry out a follow-up evaluation to investigate the maintenance of therapeutic outcome for their cost, but retention issue arises. The evaluations could be completed online to help with this. In terms of therapist bias, all therapist was trained in both types of therapy. (Carrot et al., 2019).

The study of Carrot et al. (2019) and Eisler et al. (2016) results are similar in some ways. Both studies compared multi-family therapy and single-family therapy efficacy, but additionally, Carrot et al. (2019) study looked at the cost of the therapies. Both methods of the study are RCT, and they found that both treatments are effective for adolescent AN, but in Carrot et al. (2019) study MFT was more cost-effective only. Eisler et al. (2016) found MFT more effective, on the other hand, but in 18 months follow up, they both have same the efficacy. The conclusion of these studies is both multi-family or single-family therapies, which are family-based treatments, are effective for adolescent AN.

DISCUSSION

In terms of effectiveness of Family-based treatments which they have particular types such as, parent-focused therapy (PFT), Intensive parental coaching (IPC), Multi-family therapy (MFT) and single-family therapy (SFT) for AN in adolescence. Out of seven studies, four studies founded that FBT and types of family-based treatments effective from one to another in adolescent AN but in no longer than including 12-months follow-up (Grange et al., 2016; Jacobi et al., 2018; Eisler et al., 2016; Carrot et al., 2019).

According to these FBT studies, each study compares effective over each type of treatment for adolescent AN. PFT found to be effective than FBT in reduction of symptoms in EDE score and gain weight (Grange et al., 2016; Jacobi et al., 2018) but in 12 months follow up Grange et al. (2016) found no significant differences between FBT and PFT. Jacobi et al. (2018) found in 12 months follow up adolescent gain weight significantly but web-based study did not find efficacy of PFT because of no participation of parents. In eating disorder pathology, AN patient's reduction of weight is a serious problem. PFT provides weight gaining and reduction of symptoms which benefits adolescence to become healthy. The particular type of study Wallis et al. (2017) found AN group poor function in general function, behavioural control and problem solving compare to non-clinical group and poor agreement in the parents especially mother in communication. The conclusion for this study is therapy is not providing improve family process for communication and relationship with each other during the adolescent development. Therefore, therapist needs to strengthen relations between adolescent and family for more effective therapy results in the AN psychopathology.

The other highlighted results of this review are feasibility and acceptability of FBT in AN for Adolescent. FBT-TAY is feasible in adolescent AN which improvements of EDE scores in EOT

and 3 months follow-up (Dimitropoulos et al., 2018). On the other hand, Lock et al. (2015) use adaptive treatment called IPC and they found it is feasible in FBT when the adolescent does not show weight gain in the fourth session of FBT. There was no difference between each other, both FBT and IPC are feasible in adolescent AN (Dimitropoulos et al. 2018; Lock et al., 2015). It is suggested that If adolescent cannot gain weight at the fourth session of FBT, IPC could additionally use but the results show us IPC have no superior effect. Although these studies look feasibility of FBT and additional treatment, both studies founded FBT is effective in adolescent AN. Using other method in adolescent with AN are contributes alternative therapies for eating disorder interventions.

The other family-based treatment types MFT and SFT comparison showed that there were no significant differences between MFT and SFT in terms of effectiveness but MFT founded more cost-effective and family satisfaction is higher (Eisler et al., 2016; Carrot et al., 2019). MFT is no less effective compare to SFT but has a low cost. Individual who are suffering AN, eating disorders are substantial economic and social burden we could see in the other countries length of time is limited to stay inpatient and more limited in weight restoration. This cause also low successful treatment. In addition, cost-effective analyse could show us other available effective treatments like MFT could use for low-income families (Carrot et al., 2019).

Similarly, there are matched studies with our study results. The prior literature studies founded same results of remission of AN symptom in 12 months follow-up (Crisp, 1991; Dare, 2001). On the other hand, the study of Grange et al. (2016) found for parent focused therapy reduction in symptoms in 6 months but not 12 months follow-up. It shows us both FBT and PFT is effective family-based interventions in short-term. PFT is effective in long-

term both they are effective that they need to make more follow-up sessions. Lock et al. (2010) study found remission of AN symptoms rate higher in MBFT compare to SFT in the 6-12 months follow-up sessions. Our findings prove the study that when comparing MFT and SFT, MFT is more effective therapy but in longer follow-up sessions it shows both are the same efficacy. Besides, Cochrane review, they found FBT has no superior effect on FBT in adolescent with AN (Fisher, Hetrick, & Rushford, 2010). This literature review found effect between family-based therapies one to another, but this effect not seen in the follow-up sessions. In long-term follow-up sessions, such as 18 months or 3 to 5 years FBT efficacy were not seen. The literature review findings are mixed and inconsistent between Cochrane review.

The methodology of the studies is varying between each other. Most of the studies use randomised control trials (RCT) (Grange et al., 2016; Jacobi et al., 2015; Eisler et al., 2016; Carrot et al.,2019). The studies claim that using RCT makes research more strength. Although, Jacobi et al. (2015) study use RCT methodology, the study has a lot of limitations and one primary findings. The inclusion criteria of participants in studies are same that DSM-5 and earlier additions except Wallis et al. (2017) study include risk of AN children. Also, no study includes criteria of comorbid psychiatric disorder except Wallis et al. (2017) and Lock et al. (2015). Most of the studies sample size is large but Dimitropoulos et al. (2018) study has small sample size which is 26 participants. Small sample size studies have low reliable data and not generalizable results. Jacobi et al. (2015) study recruited large sample, but study has high dropout rate because of adults not seen AN risk in their children. The age range of adolescences was large and varied in the papers and the what is important for FBT treatment at age 11 is different from age 20 hasn't explored yet. The studies mostly include outpatient because, FBT treatments are based on outpatient settings that some studies

recruit inpatient participants when they medically stable (Wallis et al., 2017; Carrot et al., 2019). Jacobi et al. (2015) study is the only study that uses web-based intervention. Although future researchers recommend web-based intervention, it is easy to recruit participants, but it was not seen any effect on Jacobi et al. (2015) study.

All of the studies make follow-up sessions except Lock et al. (2015). The limitation of the study is they need to make follow-up sessions for finding strength results to include eating disorder psychotypology. Most of the studies use similar questionnaires for measuring AN. The common ones are EDE, Yale-Brown Cornell eating disorder scale (Mazure et al., 1994) and mBMI (Centers for Disease Control and Prevention, 2009). The studies conducted different countries and used populations like Canada, Australia, Germany, UK and France (Dimitropoulos et al., 2018; Wallis et al.,2017; Jacobi et al., 2015; Eisler et al., 2016; Carrot et al., 2019). This variety could show us family-based interventions applicable to worldwide. The clinical gap is all the counties are European countries which they need to look Middle east or other countries rather than Europe because Europe is more individualistic that may make more difficult to apply FBT. On the other hand, for collectivistic culture, people enjoy being crowded and with their family. This culture differences might affect family-based interventions results. The only cost-efficacy study made by Carrot et al., (2019) which found MFT is more cost-effective than SFT. Future researchers can look FBT and other types of family-interventions cost comparison between each other.

The studies have some strengths parts, the studies have different types of family-based treatments and shows additional treatments for AN adolescent. All studies are manualized the treatments. For each different family-based intervention, therapists are trained and skilled. Most of the studies give supervision for the therapists to apply accurate therapy

except Wallis et al. (2017) and Lock et al. (2015) studies. The studies inclusion and exclusion criteria were broad which makes studies more realistic. The studies sample were representing clinical populations in health-care systems. The studies dropout rate was low, except Jacobi et al. (2015) and Dimitropoulos et al. (2018). These studies drop-out rate were high because families who have adolescence with AN not seen risk factor of low weight, families no time to participate in the study and families have biases for the therapy (Jacobi et al., 2015). High-drop out creates difficulties for family-based therapy because the TAY Who has independence withdraw from FBT therapy. In Western, Society, independence from the family expected, and families have more difficulties in convincing their children for the FBT (Dimitropoulos et al., 2018). The pragmatic design of the studies represents special community-based eating disorder services. Although, the study's findings add to evidence for effectiveness of family-based treatments for adolescence AN. There are some clinical gaps in family-based interventions. In the world, healthcare systems are different in countries such as, UK outpatient studies recruited sample 75-78% of mBMI but US and Australian studies recruited weight higher which creates a discrepancy in effect of the studies for process of recovery and weight which have made in the EOT. This contradiction shows generalizability of studies is low one health service to another. The application of Family- based intervention is varying across the countries (Eisler et al., 2016). Especially, MFT is not to implement global treatment settings (Carrot et al., 2019).

The clinical implication of Family-based treatments model in adolescent AN is, Family-based treatment in young people model empowers families to support paediatric adult treatment systems. The findings of the Dimitropoulos et al. (2018) study encourage clinicians to involve families in the treatment of AN with considering the problems of autonomy, independence and collaborate between family and adolescence. When applying FBT for an

older teenager or young adults, clinicians need to look at developmental processes like school, finance, living with both parents to integrated into the therapy for efficacy of FBT.

In terms of the strengths of the studies, there are some limitations, generalizability of the study is low because different countries in healthcare systems implement family-based interventions differently. The most common limitation of overall studies is giving relapses in AN for-follow-up sessions. In the follow-up sessions, efficacy of family-based interventions between each other is not seen. Generally, sample size is large and good to represent clinical population, but some studies sample size is modest (Wallis et al., 2017; Dimitropoulos et al., 2018; Lock et al., 2015). Further, because of the modest sample size, they have a high drop-out rate compare to larger sample size studies. In the family-based treatments in adolescent AN. The study of Carrot et al. (2019) made a follow-up session to assess maintenance of results and better evaluate the cost of the MFT in longer, which creates retention problem.

The further studies need to maintain retention rate like regular phone calls, improve communication with coordinating psychiatrist. (Carrot et al.,2019). Secondly, most of the evaluations could do online includes personal access codes. This technique would allow to studies gathering important information if the family and patient not willing to participate or come to study for the assessment (Carrot et al., 2019). Further studies need to find what is important for FBT treatment at age 11 is different from age 20, or there is any treatment effect between these ages. The Further studies need to do longer study for the feasibility of the design and efficacy of the intervention confirms these findings. The Family-based treatments in adolescent AN required longer follow-up session for long-term outcomes when comparing the efficacy of FBT studies. Application of strict weight and remission rates in FBT still not seen in longer follow-ups. By looking severe and high mortality rate for AN,

they need to develop novel and advanced treatments methods or find additional adaptations of FBT (Grange et al., 2016). Although Lock et al. (2015) use adaptive treatment for FBT, it has found differences in the follow-up, but it is adaptable.

The studies need to understand the effect of treatment and adolescent developmental processes with AN. Also, different perspectives of parents need to be considered. In the last phase of FBT, the study shows us although FBT operates family effectively but not made parental recovery. The clinicians not only monitor the family, they need to look parents respond and how they are coping with treatment (Wallis., et al 2017). Future studies also required FBT-TAY focusing on making clinical interventions related to ego-syntonic AN disorder and assist parental empowerment if their support was not effective. Furthermore, FBT in adolescent comparing CBT RCT study is needed (Dimitropoulos et al., 2018).

Moreover, for finding risk factors of AN, future studies need to develop population-based studies. They need to find reasons why parents did not recognize risk factors. Also, they need to develop effective assessment for gathering information. Parents need to be educated about possible risk for eating disorder like dieting and weight loss in the child. Future research also needs to make FBT treatment more accessible, the Jacobi et al. (2015) study offered curriculum of the school. Still, they make intervention in school might decrease avoidance and stigma. The future studies need to look at how other cultures respond to FBT therapy compare to Western cultures or Europe (Dimitropoulos et al., 2018). The common and main future direction for researchers is longer-term follow-up sessions, and longer FBT treatments are needed to look efficacy of family-based treatments in adolescence.

CONCLUSION

In this review, evidence-based articles show that family-based treatments effective in adolescent AN but not seen effectiveness between studies in the follow-up sessions (Grange et al., 2016; Jacobi et al., 2018; Eisler et al., 2016; Carrot et al., 2019). This literature review strengthened with compare family-interventions effectiveness between one to another. The review found effectiveness one to another in the EOT. Both family-based treatment is effective, but effectiveness one to another was not seen in the follow-up sessions. Although FBT therapies found to be effective, many gaps in the literature need to be investigated and explore novel methods for AN. AN literature involves a few data in terms of long-term effectiveness in treatments for the disorder. Nevertheless, there are evidence-based and significant cases on the efficacy of family-based interventions.

Only, Carrot et al. (2019) additionally found MFT is cost-effective therapy that reduces the economic burden for an adolescent with AN family. Lock et al. (2015) founds, although there were no superior effects found in IPC compared to FBT. IPC can use for FBT If the adolescent cannot gain weight after the fourth session of FBT. This shows that, although studies suggest additional treatment method for adolescent AN, Jacobi et al. (2015) study not found differences between IPC and FBT in effectiveness. The prior study's findings are consistent with these literature review findings (Lock et al.,2010; Crisp, 1991; Dare, 2001).

This literature review methodology is strong, the studies use large sample sizes and make multiple designs and use multiple resources when they make comparisons between family treatments. Most of the articles use RCT technique (Grange et al., 2016; Jacobi et al., 2015; Eisler et al., 2016; Carrot et al.,2019). The family-based studies are manualized, and therapist

trained and skilled. The main strengths of the study are compares different types of family-based treatments and shows family-based treatment is effective in adolescent AN.

The main limitation of this review is there was no efficacy seen follow-up sessions. In addition, in future studies, they need to make more longer follow-up sessions and longer family-based interventions. Dimitropoulos et al. (2018) recommends continues family support for TAY through follow-up is necessary for maintaining recovery time. Although, FBT founded be effective for adolescent with AN, in the literature there is lack of alternative therapies that make comparison especially on adolescent AN (Grange et al., 2016).

Although these limitations, all studies accept their limitations and suggest further directions for AN in adolescence. This literature reviews age range of adolescent is 11-20 but the studies do not look like they have any differences between these ages for effectiveness in FBT. Further studies need to investigate adolescent who age 11 is different from age 20 in terms of therapy effectiveness. The family-based treatment design found feasible for adolescent with AN, still, future studies need to make longer follow-up because in the follow-up sessions effectiveness of the FBT therapy reduced (Dimitropoulos et al., 2018; Lock et al., 2015). Further, the studies need to compare FBT with other therapies in terms of which one is more effective for adolescent with AN. Every country applies family treatments is differently so that future studies need to be considered effectiveness of FBT could change one to another in health populations. This literature review could give insights for AN in adolescence about effectiveness of family-based interventions.

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