Efficacy of Family Intervention in Children with Autism Spectrum Disorder: A Meta-Analysis

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ABSTRACT

Objective: Previous studies have shown that there is a lot of evidence for the efficacy of family therapy for children with autism spectrum disorder, but no specific meta-analysis has been conducted so far, and there is a lack of evidence of efficacy.

Materials and methods: To systematically review the effect of family intervention on children with Autism Spectrum Disorder (ASD). PubMed, Embase, Cochrane Library, Web of Science, China National Knowledge Infrastructure (CNKI), Wanfang Data Knowledge Service Platform, VIP database and China Biology Medicine Disc were searched by computer. The Randomized Controlled Trials (RCTS) of family intervention in children with Autism Spectrum Disorder (ASD) were searched from the establishment of the database to May 2023. The experimental group added family intervention on the basis of the control group. Two researchers independently screened the literature and extracted the data, and the risk of bias of the included studies was assessed using the Cochrane Handbook for Systematic Reviews 5.1.0. RevMan 5.4 was used for statistical analysis.

Results: A total of 15 studies involving 1249 patients were included. The results of meta-analysis showed that family intervention could increase the score of ASD scale, CARS children Autism rating scale (MD=-2.56, 95%CI (-3.02, -2.02), P< 0.05), ABC Autism Parent Rating Scale (MD=-9.87, 95%CI (-10.76, -8.99), P< 0.05), ATEC Autism Treatment Evaluation Scale (MD=-11.11, 95%CI (-12.05, -10.18)).

Conclusion: The results of this study showed that the addition of family intervention to conventional intervention could increase the therapeutic effect of children with autism spectrum disorder compared with conventional intervention alone.

Keywords: Autism; Meta-analysis; Family intervention

INTRODUCTION

Autism Spectrumdisorder (ASD) is a neurodevelopmental disorder characterized by social interaction and communication disorders, narrow interests and stereotyped repetitive behaviors, which belongs to the category of neurodevelopmental disorders [1,2]. At present, the US Centers for Disease Control and Prevention reported that the prevalence of ASD was 2.27% in 2021, and the global prevalence was about 1/44. The prevalence of ASD in China has reached 0.7%, which is equivalent to 1 ASD patient in every 143 children, and it is constantly on the rise [3,4]. It imposes a huge burden on individuals, families and society [5].

Studies have shown that early intervention for autistic patients can effectively alleviate the symptoms of autistic patients and reduce the occurrence of secondary behavioral and emotional problems [6]. The golden period for ASD intervention and treatment is 2-5 years old. Research on pediatric brain science also shows that the brain is most active in infancy [7]. Empirical studies have shown that family intervention can benefit ASD children and their families in terms of time and treatment effect.

Green, et al. [8], continuously tracked the long-term effects of family intervention. Compared with the control group whose parents did not receive training, children in the family intervention group had more physical and verbal communication with their parents, and the core symptoms of ASD were also improved in the long term and effectively [8]. Zou, et al. [9], used remote training for parents to intervene in children's home rehabilitation measures, and the results showed that the social ability and communication skills of children with ASD were improved. The rehabilitation of children with ASD needs to accompany their whole life, and children with ASD spend the most time at home and their parents spend the most time with them, so family intervention is particularly important in the treatment of children with ASD [9]. Parents understand and actively participate in the daily rehabilitation process. In this way, children with ASD can use more eye contact, positive emotion, common play and active oral communication to communicate with others, which can improve the effect of intervention and rehabilitation [10]. In recent years, there are more and more studies on the early intervention of family intervention in children with ASD, and the results are not the same, but the research methods are not the same among different studies, and there is great heterogeneity among the results evaluated by most studies. This paper conducts a meta-analysis through RCT literature on the application effect of family intervention in children with ASD. New evidence-based medical evidence was explored according to specific treatment measures [11].

MATERIALS AND METHODS

Inclusion and exclusion criteria

Study category: RCTS on the efficacy of home rehabilitation nursing intervention for children with autism.

Subjects: Children who met the diagnostic criteria of Psychiatry and the Fifth edition of the statistical manual were diagnosed with ASD [12].

Intervention measures: Divided into experimental group and observation group, the observation group used traditional intervention measures, such as; Rehabilitation institutions formulate interpersonal communication training, life skills training, language communication training, and behavior modification training programs for children with ASD according to their conditions. The experimental group added family rehabilitation nursing on the basis of the observation group. The family rehabilitation nursing measures included: Interpersonal relationship method, social games, music therapy, integration education, language intervention, etc.

Outcome measures: The Childhood Autism Rating Scale (CARS) consisted of 15 items, including interpersonal relationship, imitation, emotional response, stereotyped behavior, object use, and transition adaptation. It is suitable for children under 6 years of age and children with an IQ below 80 [13]. The smaller the score, the better the function of the ASD patients. The Autism Behavior Checklist (ABC) assesses the behavior of children with autism in five domains: Emotion, communication, physical movement, language, and self-care ability. The lower the overall score of children with autism, the

better their behavior [14]. Autism Treatment Evaluation Checklist (ATEC) was used to evaluate the symptoms of children with autism, which mainly included the following four dimensions: Expression/language communication, social ability, health/physiology/behavior, and a total score of 75 [15].The higher the score of each dimension, the more severe the symptoms of autism.

Literature search strategy computer search

Chinese databases: China National Knowledge Infrastructure (CNKI), VIP database, Wangfang data.

Foreign language databases: Cochrane library, Pubmed, Embase, Web of science. On this basis, this project intends to search for clinical RCTS related to family intervention by establishing a database. Chinese search terms: Autism, autism spectrum disorder, autism spectrum disorder, family, family therapy, family intervention. English search terms: Family therapy, family intervention, family, autism, autistic disorder, autism spectrum disorder, ASD.

Outcome measures

Two trained researchers conducted separate literature searches in the database. After reading the titles and abstracts of the search results, papers that met the inclusion criteria were downloaded after individual screening. On this basis, we reviewed all the articles downloaded from the Internet and rigorously screened them according to the inclusion and exclusion criteria, which were verified by 2 researchers. If there were any objections, the third researcher would adjudicated, and the valid data of the final included studies would be extracted.

Contents: Title, author, publication date and source; the intervention on the subject; the process of randomization was blinded; evaluation indicators of the evaluation results.

The quality of the included studies was evaluated according to the RCT quality evaluation criteria in the Cochrane handbook. The randomness of randomized grouping, the concealment of grouping method; whether blinding method was used; the integrity of the study results and data. Report the survey results selectively, other sources of bias [16].

Statistical analysis

All data were extracted from the original data, including count data and measurement data. All data were imported into Review Manager5.4 software for Meta-analysis. The results were compared by or (P value in count data) using the "count data" method [17-25]. If there was heterogeneity between the two studies, a randomized model (I^2=0) or subgroup analysis would conservatively be required to combine the data. In the combined results, if I^2 was found. At 50%, heterogeneity was considered not significant and a fixed effects model could be used.

RESULTS

Results of literature screening for details of literature screening map, and for basic characteristics of included literature

Basic characteristics of the included literature and results of bias risk assessment

A total of 15 RCTS of home-based rehabilitation nursing were included in the meta-analysis. A total of 1249 ASD patients were included, 625 in the experimental group and 624 in the control group, including 784 males, accounting for 63%; There were 476 females, accounting for 37%. In the 15 RCTS, the control group received routine rehabilitation treatment and routine nursing treatment, and the experimental group received family rehabilitation nursing treatment on the basis of the control group. Seven of the included studies concealed high risks by the allocation method, and only one study stated that the bias risk of the included studies was double-blind.

Results of meta-analysis

CARS three randomized controlled trials used CARS to evaluate the symptoms of children with autism spectrum disorder, and the heterogeneity test showed low heterogeneity and the results were reliable [26-30]. A fixed effect model was adopted (P=0.32, I^2=12%). The results showed that the CARS score of the experimental group was lower than that of the control group (MD=-2.56 95%CI-3.09-2.02), and the difference was statistically significant.

Rainfall distribution on 10-12 ABC article nine randomized controlled trials using ABC to evaluate children autism spectrum disorder symptoms [17,18,22,23,25,26,28,29,31], heterogeneity inspection shows moderate heterogeneity, the result is reliable. A fixed effect model was used (P=0.02, I^2= 54%). The results showed that the CARS score of the experimental group was lower than that of the control group (MD=-9.87, 95%CI-10.76-8.99), and the difference was statistically significant.

Ten randomized controlled trials of ATEC used ATEC to evaluate the symptoms of children with autism spectrum disorder [17-25,31], and there was no heterogeneity in the heterogeneity test of each article, and the results were very reliable. A fixed effect model was adopted (P=0.58, I^2=0%). The CARS score of the experimental group was lower than that of the control group (MD=-11.11, 95%CI-12.05-10.15), and the difference was statistically significant.

Sensitivity analysis after excluding individual studies one by one, sensitivity analysis found that there was no significant change in the results. The results of meta-analysis were more stable, so it was not very helpful for meta-regression and subgroup analysis.

Publication bias in this study, ABC and ATEC were used to analyze the outcome indicators by funnel plot, and the results showed that: In the ATEC study, the dots were located in the middle of the funnel plot method, and the two sides of the midline were symmetrical. In the ABC study, the dots were partially distributed at the edge of the funnel plot, but were generally symmetrical on both sides of the midline, suggesting that the possibility of deviation was low (Figures 1 and 2).
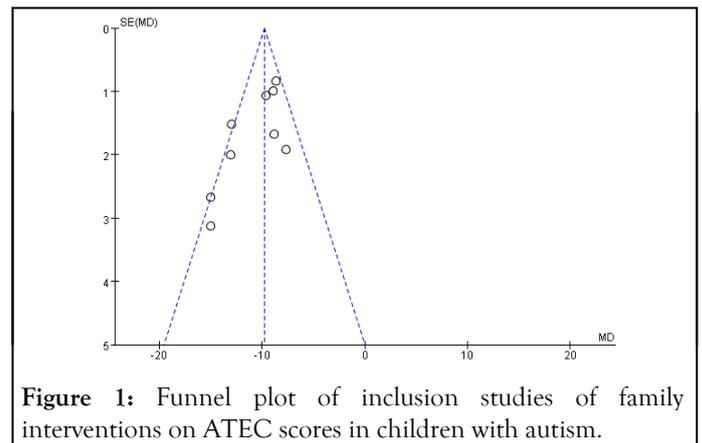

Figure 1: Funnel plot of inclusion studies of family interventions on ATEC scores in children with autism.
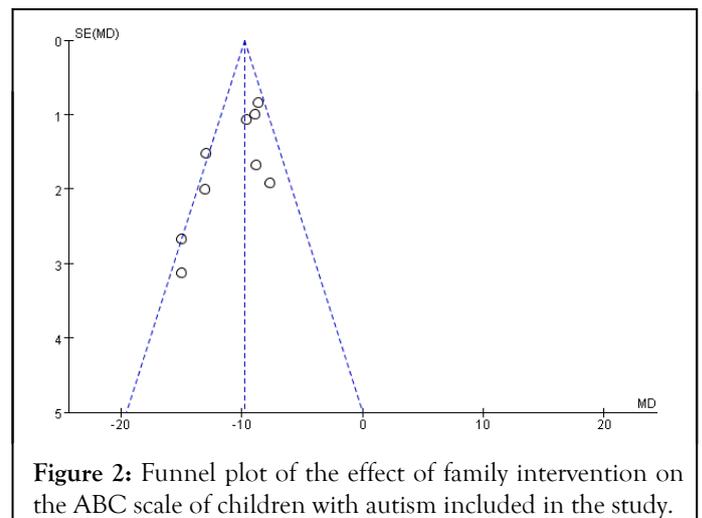

Figure 2: Funnel plot of the effect of family intervention on the ABC scale of children with autism included in the study.

DISCUSSION

In recent years, the proportion of children with autism has continued to increase [32]. The treatment, care and training of children with autism are usually undertaken by parents. At the same time, they also have to undertake the task of education, care and training of children with autism, which is a difficult and heavy work for them. Under such circumstances, they are often under great mental pressure and prone to bad emotions [33]. Negative emotions have a negative impact on the educational concept, educational attitude and parenting style of parents of children, thereby reducing the efficacy of rehabilitation training of children [34]. Family is the most important environment for children with autism, and parents should participate in the treatment process of children with autism anytime and anywhere, so that children can obtain better training effects [35]. Family intervention has a deep impact on the behavior, basic feeling and interpersonal communication of children with autism [36], so family intervention has a great role in the rehabilitation treatment of autism. The main contents of interventions included in this study included interpersonal relationship intervention, behavior and movement training, language intervention, auditory intervention, game training, daily life activity training and parent health education. The results of this study showed that family intervention for children on the basis of routine intervention was very effective, but the

results of ABC scale were moderately heterogeneous, which may be due to the differences in the severity of autism in the included data. At the same time, it was found in the retrieved data that family intervention could effectively reduce the anxiety and depression of the family members caused by the children's condition [37]. The emotional problems caused by the high nursing pressure of the family members should also be paid attention to. The stable emotional state of the family members can provide a better rehabilitation environment for the children with autism.

Application of family intervention in the treatment of autism

Family therapy is an inclusive systemic psychotherapy intervention designed to enhance communication, relationships, and functioning of all family members. The aim of this intervention was to facilitate discussion among family members about difficult situations, such as the impact of core ASD characteristics on the family unit [38]. The common family intervention measures include parent training, family environment assessment, etc. Recent evidence suggests that individuals with ASD and their family members benefit from psychological interventions focused on improving coping and resilience and reducing stress and mental health morbidity. But the results only focused on individuals with autism or family members, not a combination of the two [39]. Oono, et al. [40], summarized the differences in parental intervention methods, frequency and target selection among different research designs. This conclusion is similar to the views of some other scholars that the influence of the degree of parental intervention on the intervention effect may not be determined by parents or therapists alone, but to what extent can be attributed to parents or therapists or both [40].

In general, family intervention can effectively help parents create learning opportunities through simple games and training in daily life and communication. Technology-centered intervention for parents can effectively improve the core symptoms of children with ASD and improve the treatment efficiency.

CONCLUSION

Existing evidence shows that family intervention on the basis of conventional treatment has a significant effect on the improvement of symptoms in children with ASD, and children have a higher degree of cohesion in family, which is helpful for the implementation of treatment. However, due to the lack of a large number of multi-rehabilitation institutions, double-blind, high-quality RCT studies to explore the efficacy and mechanism of family intervention on children with ASD, and the lack of standardized intervention procedures and processes, it is difficult to comprehensively and accurately reflect the real effect of family intervention on children with ASD.

STUDY LIMITATIONS

There are few high-quality RCTS on family intervention for ASD children in China, and there are differences in the selection of outcome indicators and intervention measures,

resulting in high heterogeneity of some data, but the results are still reliable. How to establish the standardization of intervention methods and intervention intensity; whether the personnel who train parents have professional qualifications; and there are relatively few studies on family intervention for parents' emotional state, so family intervention needs to be further studied. Reduce the pressure on parents, children and society. Due to the limited number of studies included in this review and variable methodological quality, preliminary research on parental experiences is needed to further understand healthcare visits by parents of children with autism. Future research is recommended to focus on children with more severe levels of autism and to work with parents from socioeconomic, educational, and cultural demographics.

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