Comparison of the Treatments of Autism Spectrum Disorder for Children

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ABSTRACT
Autism Spectrum Disorder (ASD) is a complicated, pervasive, and heterogeneous developmental disorder that is characterized by social communication disorder, verbal and nonverbal language defects, limited interests, and stiff behaviors. These symptoms may to a large extent affect the normal life of patients. Therefore, it is crucial to find an effective and targeted intervention to alleviate the symptoms of ASD. This passage compares the effectiveness of several therapies for ASD patients through comparative analysis and research based on previous studies: pharmacological therapy, which mainly makes use of several neurotransmitters, applied behavior therapy, which improves social communication through positive reinforcement, acupuncture based on Chinese medicine, and gluten- and casein-free intervention to influence enteric system. Because the etiology of ASD is unknown, there seems to be no most effective treatment which deserves further research.

Keywords: *Autism spectrum disorder, applied behavior therapy, gluten- and casein free, acupuncture, drug therapy.*

1. INTRODUCTION

According to the Center for Disease Control and Prevention, approximately 1 in 44 children are diagnosed with ASD, and it shows an increasing rate for people to become ASD patients. Autism Spectrum Disorder (ASD) patients typically lack demonstrates deficits in three respects: impairments in social interaction, defects in verbal and nonverbal language, and stereotyped behavior [1, 2]. It is reported that there are now only 1%-2% of people in the general population who suffer from autism spectrum disorder with a higher ratio of male patients compared to female average [3]. There are also differences between different gender: males are apt to show more behavior disorders such as aggressive or compulsive behavior [2]. Patients, usually children, demonstrate some psychiatric and cognitive comorbidities including attention deficit hyperactivity disorder (ADHD), depression, and intellectual disability. [3, 4] On account of the former description of the symptoms of ASD patients, it is obvious that ASD patients may have difficulties in having normal social interactions with others and forming social bonds, which means that they will not be well-adapted to a normal social life.

Although people have known more about autism spectrum disorder now, more research should be done about the cause of the disorder and treatment options. This passage compares and analyzes the treatments widely used: traditional Chinese treatments, drug therapies, behavioral therapy, and nutritional interventions for ASD patients. By illustrating the efficacy and cost-effectiveness of the treatments, it is expected to find prime or optimal treatments for mitigating the symptoms of ASD patients in order to ensure their normal social life.

2. THE CAUSE OF ASD AND NODUS OF TREATMENTS

2.1 The cause of ASD

Scientists still cannot recognize the cause of autism spectrum disorder now, but there are some hypotheses for what factors contribute to autism spectrum disorder. One study suggests that autism spectrum disorder may be associated with chromosomal abnormalities [3]. By using traditional karyotyping techniques, researchers discover a large number of unbalanced karyotypic abnormalities in ASD with related dysmorphic traits. Meanwhile, changes and alterations in structural chromosomes have

been identified for each chromosome, including deletions, duplications, inversions, and translocations as well as marker chromosomes [3]. The majority of the abnormalities are non-typical and the role that they are playing in ASD is not certain. Some chromosomal aberrations detected in ASD patients involve aneuploidies: 21 (Down syndrome), X (Turner syndrome, Klinefelter syndrome, XXX syndrome), and Y (XYY syndrome) [3, 5].

Apart from genetic studies of autism spectrum disorder, environmental risk factors may also contribute to ASD. Several studies imply that birth complications such as trauma or ischemia and hypoxia are identified to be strongly correlated with ASD, while ASD may not be correlated with vaccination, medicine use during the antenatal period, and maternal smoking [6]. However, there are lots of limitations for current studies. Further research should be conducted based on a larger sample size, direct measurements, prospective design, and obvious causality between environmental factors and ASD by eliminating the effects of the gene.

2.2 Nodus of treatments

Autism spectrum disorder can be referred to as a polyfactorial hereditary disorder with thousands of gene playing a role in the complex interaction between heredity and environmental factors. [7,8] On account of the dynamic interactions between gene and environmental factors, it is hard to find out a specific cause for ASD. Although due to progress in epidemiological and molecular genetics, researchers have recognized potential genes related to ASD; however, the specific number of genes and genetic risks factors are hard to determined except for several identified chromosomal abnormalities and some gene that is associated with increasing risk factors for ASD. [7,8]

3. TREATMENTS FOR ASD

Numerous problems and individual differences faced by ASD patients demonstrate that there is no the most effective treatment for curing ASD. Researchers generally contend that the key is to improve the self-care, cognitive, social interaction, and social adjustment abilities of ASD patients in daily life through the special education training process and behavioral interventions [2]. This research may involve the investigation towards some relatively popular therapies — pharmacological therapy, applied behavior analysis (ABA), acupuncture, gluten- and casein-free intervention.

3.1 Pharmacological therapy

Traditional treatments for ASD include pharmacological therapy and psychological therapy such as behavioral therapy. According to a survey that investigated 3000 families with ASD patients in America, 21.7% use antidepressants, 16.8% take antipsychotics, and 13.9% take agonists. Among these medicines, risperidone, a kind of antipsychotic, is the only pharmacologic intervention that passes the drug criteria of the U.S. Food and Drug Administration (FDA). This medical and biomedical therapy method is effective, safe, and acceptable in targeting aggressive behaviors, irritability, hyperactivity, and self-injury, but does not deal with deficits in communication, and repetitive behavior [2].

Studies manifest that the symptoms of irritability experience an at least 25% decrease in the test after receiving risperidone for eight weeks [11]. Nevertheless, the side effects of risperidone are weight gain, increased appetite, lethargy, sluggishness, dizziness, and drooling [11]. While investigating the long-term effect of risperidone, it is significant that after treating 6 months risperidone, 12.5% of patients suffer a relapse compared to 62.5% of patients who were given a placebo [11]. Relapse refers to a 25% increasing score on the irritability of subscale score and Children's Global Assessment Scale (CFI-I) score from baseline.

3.2 Applied behavior analysis

Applied behavior analysis (ABA) is an early intervention that is based on operant conditioning proposed by B.F. Skinner. ABA often takes place in a non-distracting condition, and involves separate intervention targets based on children's reactions [13]. In order to achieve the intervention target, the therapists may use prepared materials and make sure all the things are under control over the stimuli and reinforcer. After the initiation of skill acquisition, the therapists will aim to help patients to generalize these skills into daily life by repetition and step-by-step curriculum until patients can apply these skills in their normal life [13].

Results of analyzing the efficacy of ABA as a treatment for ASD patients indicated it brings about medium positive impact in intellectual functioning, language development, and adaptive behavior [11, 14]. Despite its strength in curing ASD patients, the limitation of this therapy is concerned with the length of the time to alleviate the symptoms such as reducing stiff behaviors and enhancement in social functioning, usually more than 20 hours a week [11]. Due to this long therapy session, the cost of ABA can be substantial. Other limitations may be associated with the debatable practicability and generalizability of taught skills and patients may lack the motivation to perform the tasks assigned by their counsellor [11].

3.3 Acupuncture

As the developing knowledge towards ASD, traditional Chinese treatments have a deeper and further understanding of the cause and the treatments for ASD

[2]. They reckon that the interventions and treatments of ASD should be divided into four main respects: to rectify the psychological disorder, to promote the growth of the nervous system, to reduce the influence of pathological factors, to reinforce the learning process correct unconscious ideas at conscious level [9].

Traditional Chinese therapies mainly include acupuncture and traditional Chinese medicine. One of the acupuncture therapies frequently used is "Jin's Three Needling" created by professor Jin. For ASD patients, it is a set of "three needles" system based on head acupoints [2]. "Jin's Three Needling" is efficacious in alleviating the symptoms of impairments in verbal and nonverbal language use, stiff stereotyped behavior, and deficits in social communication [9]. Researchers now conjuncture that it may be acupunctures on the head stimulate specific acupuncture points and to some extent stimulate the cerebral cortex, and therefore it alleviates the symptoms of ASD patients [2].

Notably, with the ASD people both receiving acupuncture, massage, and traditional Chinese medicine, the symptoms of about 90% of ASD patients are eased to varying degrees; the rest 10% has no effect, mainly in those with severe mental retardation or those who are too old for optimal treatments [10]. Several studies that use a comparison group report that acupuncture therapy is more efficacious than behavior therapy, Chinese medicine, music treatment [1]. Although improvements are observed, due to the poor design of previous studies, including assessment bias, control groups, and subjective variable measures, it is hard to interpret the efficacy and safety of acupuncture [15]. Therefore, future studies should pay more heed to the experiment design in order to get a more valid and non-biased result.

3.4 Gluten- and casein free intervention

Professionals in the field hypothesize that autism spectrum disorder may be associated with the excess amount of gluten and casein the diet goes into internal fluid and central nervous system of ASD patients, resulting in some symptoms of ASD [16, 17]. Therefore, in order to reduce the excessive gluten and casein, scientists propose gluten-free and casin- free diet (GFCF) to hinder gluten and casein compounds entering the internal fluid [17].

Some researchers by using random control treatments and treating 72 patients found that notable differences between the group that was given GFCF treatment and the one that was not, especially in the symptoms of social withdrawal [18]. The group that received GFCG was observed amelioration in communication, social interaction, daily skills, and hyperactivity sub-domains [18]. Meanwhile, there are no observable side effects for GFCG diets. However, some studies present opposite results as the former ones. Thirty-seven patients in the experiment were assigned to a normal diet (with gluten and casein) and a GFCG for six months with a random sequence of the treatment [19]. Researchers found out that the six-month GFCG diet only presented a slight improvement in the symptoms of ASD [19]. Therefore, the efficacy of the GFCG diet requires further research considering the placebo effect and blinding elements [19].

4. DISCUSSION

Based on the aforementioned discussions, there is not any single treatment that is superior to others. For drug therapy, risperidone is capable of lessening aggressive behaviors and enhancing social interactions for ASD patients. It may be effective in treating one of the core symptoms of ASD patients — restricted behavior. However, treating risperidone for patients may result in slight sedation, weight gain, and mild dyskinesias, which other treatments mentioned in this passage may not have. Applied behavior analysis produces positive outcomes for treating ASD patients. It improves the intellectual functioning, verbal and nonverbal language, and respondence communication of the patients. One of the limitations of ABA is its cost. ABA usually requires a long session for treating usually for several months even years, and thus patients need to bear some economic pressures. For the other two alternative therapies, although there are not any obvious side effects, the effectiveness of these still deserves further research containing placebo and binding elements, ruling out confounding variables, and with a larger sample size.

5. CONCLUSION

In conclusion, this research mainly discusses the effectiveness of drug therapy, applied behavior analysis (ABA), acupuncture, gluten- and casein- free intervention. Most ASD patients will receive drug therapy and ABA, and the rest of the therapy mentioned in the research usually served as an alternative treatment. Due to the unclear causes of autism spectrum disorder, it is hard to find a particular solution that is effective in curing this developmental disorder. What the treatments now can do is to alleviate specific symptoms of ASD, but not eradicate this disorder. Thus, it is advisable to find out the cause for the autism, and form a solution regarding the neurons engaged in the disorder and the main brain circuits or gastrointestinal pathways. This research serves as a conclusion for those therapies and analyzes the benefits and its limitation to provide treatment choices for ASD patients. This study mainly involves theoretical analysis, but lacks real case studies and experimental data. Therefore, in the future, the research should compare and contrast treatments from multi-perspectives and much more thoroughly.

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