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Original Article

The Effectiveness of Holistic Multi-dimensional Treatment Model (HMTM) in the Treatment of Children with Autism Spectrum Disorder (ASD)

*Maryam Hojjati[1]

[1]Head of the School of Noor Hedayat.

Abstract

Introduction:
Autism spectrum disorders (ASD) belong to the pervasive neurodevelopmental disorders. The prevalence of ASD has increased significantly throughout recent decades, bringing the overall estimated prevalence to 11.3 per 1000 children. ASD is characterized by severe difficulties in reciprocal social interaction, stereotyped patterns of behavior and profound impairments in verbal and nonverbal communication.

Materials and Method:
In this experimental study, 150 children with ASD, who referred to psychiatry clinics of children in two Mashhad Academic Hospitals-Iran, were enrolled. At the first, they divided into 3 groups (n=50 patients in each group). All groups were educated and treated with Holistic Multidimensional Treatment Model (HMTM) method but for different periods: one, two, and three years. Data analysis was done using ANOVA and ANCOVA test.

Results:
78% of participants were boys. According to the results, 26% of participants after one year treatment, 44% after two years and 52% after three years treatment improved. The participants' symptoms of behavioral, cognitive and physical function declined in 3 groups significantly ($p<0.05$).

Conclusion:
The results suggest that holistic multidimensional treatment model has been effective in treatment of children with autism spectrum disorders in all the three groups, regardless of the gender and age. Whatever treatment period would be longer, recovery process would be more effective in children with ASD spectrum.

Key words:
ASD, Autism Spectrum Disorder, Holistic Multi-dimensional Treatment Model, HMTM.

***Corresponding Author:**
Maryam Hojjati, P.O.Box 9176783596, Mashhad, Iran.
E-mail: Hojjati_37@yahoo.com
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Introduction

Autism is a lifelong developmental disability that affects how a person communicates with, and relates to, other people. It also affects how they make sense of the world around them. It is a spectrum condition, which means that, while all people with autism share certain difficulties, their condition will affect them in different ways. Some people with autism are able to live relatively independent lives but others may have accompanying learning disabilities and need a lifetime of specialist support. People with autism may also experience over- or under-sensitivity to sounds, touch, tastes, smells, light or colours. It is a spectrum condition, which means that, while all people with autism share certain difficulties, their condition will affect them in different ways. Some people with autism are able to live relatively independent lives but others may have accompanying learning disabilities and need a lifetime of specialist support. People with autism may also experience over- or under-sensitivity to sounds, touch, tastes, smells, light or colours.

Asperger syndrome is a form of autism, people with Asperger syndrome are often of average or above average intelligence. They have fewer problems with speech but may still have difficulties with understanding and processing language (1-3).

Types of ASDs

There are three different types of ASDs:

-Autistic Disorder

(also called "classic" autism) This is what most people think of when hearing the word "autism." People with autistic disorder usually have significant language delays, social and communication challenges, and unusual behaviors and interests. Many people with autistic disorder also have intellectual disability.

-Asperger Syndrome

People with Asperger syndrome usually have some milder symptoms of autistic disorder. They might have social challenges and unusual behaviors and interests. However, they typically do not have problems with language or intellectual disability.

-Pervasive Developmental Disorder – Not Otherwise Specified

(PDD-NOS; also called "atypical autism") People who meet some of the criteria for autistic disorder or Asperger syndrome, but not all, may be diagnosed with PDD-NOS. People with PDD-NOS usually have fewer and milder symptoms than those with autistic disorder. The symptoms might cause only social and communication challenges.

ASDs begin before the age of 3 and last throughout a person's life, although symptoms may improve over time. Some children with an ASD show hints of future problems within the first few months of life. In others, symptoms might not show up until 24 months or later. Some children with an ASD seem to develop normally until around 18 to 24 months of age and then they stop gaining new skills, or they lose the skills they once had (1-3).

Epidemiology

ASD occurs more often in boys than girls, with a 4:1 male-to-female ratio (4). The reported prevalence rates of autism and its related disorders have been increasing worldwide over the past decades, from approximately 4 per 10 000 to 6 per 1000 children (5-9). The reasons for this increase include wider public awareness of these disorders, broadening of the diagnostic concepts, reclassify-cations of disorders and improved detection (4,10). The possibility that the increase in the reported cases is a result of unidentified risk factor(s) cannot be ruled out, and therefore more research is needed to address this.

Etiology

The exact cause of autism and the other ASDs is still not known. The etiologic theories have changed over the years. It was once thought to be the result of faulty child-rearing. This historical psychosocial theory has been rejected, as research clearly indicates that the etiology is multi-factorial with a strong genetic basis (11). Although the etiology is not clear, there are a minority of cases, less than 10%, where autism is part of another condition. Such cases are often referred to as "secondary" autism; these include tuberous sclerosis, fragile X syndrome, phenylketonuria and congenital infections secondary to rubella and cytomegalovirus (11-17).

Presentation

50% of parents (and more) have cause for concern by 12-18 months of age. Speech delay is a common first concern. Other common concerns include:

- Lack of, or inconsistent use of eye contact.
- Lack of social smile, imitation, response to name.
- Lack of interest in others.
- Lack of emotional expression.
- Few directed vocalisations.
- Absence of joint attention skills (pointing to "show," following a point, monitoring others' gaze, and referencing objects or events).
- Few requesting behaviours.
- Few social gestures (such as waving, clapping, nodding, and shaking head).
- Pretend play is also reduced in many children.

Regression (losing skills that have been acquired) is seen in approximately 25% of children. The skills may be in language, play or social skills (18).

Diagnosis

Physicians play an important role in early recognition of ASD, because they are usually the first point of contact for parents. Therefore, it is important that physicians be able to recognize the various signs and symptoms of this group of disorders (19). Physicians should be alerted to the possibility of autism and its related disorders when there are qualitative impairments in social, language and communication skills, as well as repetitive interests and behaviors. The severity of these impairments varies significantly among children with ASD. Even though the typical age of onset is before 3 years, the impairments can be subtle and may not be detected before school age. An example of this are children with Asperger disorder, who may be identified and diagnosed much later than children with typical autism, on average at 11 years of age(20). This is because parents of children with Asperger disorder may not recognize the subtle abnormalities in their child's behavior, because they may not have an opportunity to compare them to peers. Conversely, physicians and teachers compare a child's behavior to typically developing children and notice abnormalities and impairments more easily (20). This reflects the importance of gathering information about the child from multiple sources, especially when diagnosing the broader pervasive developmental disorders (20,21).

Treatment

Research has shown that the most effective therapy is use of early intensive behavioral interventions that aim to improve the functioning of the affected child. These interventions focus on developing language, social responsiveness, imitation skills, and appropriate behaviors. Examples of these behavioral therapies include Applied Behavior Analysis (ABA) and Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) and Comprehensive Treatment Models (CTM). The ABA approach involves teaching new behaviors by explicit

reinforcement; problem behaviors are addressed by analyzing triggers in order to change factors in the environment that are contributing to that behavior. The TEACCH approach takes advantage of relative strengths in visual information processing using strategies such as visual schedules, clearly structured and organized classrooms, and highly structured learning activities that are broken down into manageable, visually organized steps. These behavioral techniques should begin early in the pre-school period and be followed by highly individualized educational intervention in the school (22-29).

Several approaches have been presented for treatment of children with ASD. The aim of the present study was determination of Effectiveness of Holistic Multi-dimensional Treatment Model (HMTM) in the Treatment of Children with Autism Spectrum Disorder (ASD).

Materials and Method

This quasi-experimental study was conducted on 2 to 11 years old children with ASD, who were referred to the child psychiatry clinics in two academic Hospitals (Dr. Sheikh, Ebne Sina Psychiatric Hospital), Mashhad-Iran. The diagnosis was made by a child psychiatrist based on DSM-IV-TR criteria and using Autism Diagnostic Interview-Revised (ADIR) and Autism Diagnostic Observation Schedule (ADOS). Then the children were referred to Noore Hedayat center for treatment. In this study, 150 children with ASD were selected by available sampling method and divided into 3 groups: (n= 50) for the one year, (n=50) for two years, and (n=50) for three years treatment with HMTM method.

This method has the following features: 1. All aspects of child' growth (affective, emotional, cognitive, physical and emotional), is checked, and baseline training and treatment starts from Current status of the child. 2. Emphasis on a deep emotional connection and sense of security for child. 3. Emphasis on selected demographic Coach and positive feelings of coach towards the child. 4. Consider each child as unique person, who will have its own treatment program, IEP (Individual Education Plan). 5.Emphasis on training and group interacts. 6. Exposure to child in the same group based on intellectual and cognitive level. 7. Use of rehabilitation services (speech therapy and occupational therapy), based on the needs assessment of each child, and using Sensory Integration(SI) and subjective approaches. 8. Emphasis on individual and group training classes every 15 days. 9. Emphasis on teaching and learning methods HMTM for parents every 15 days. 10. Communication of ASD children with other groups of children affected to other disorders such as Down Syndrome, developmental disorders, speech disorders, cerebral palsy... with the aim of improving social communication and interaction in children. 11. Emphasis on mental evaluation and identify spots of brain damage, based on behavioral and cognitive functions for each child. 12. Emphasis on artistic skills in this children in order to Identify talents, and approaching the peer group. 13. Emphasis on emotional development, with using individual games, group games and conceptual - an argument games. 14. Emphasis on understanding, generalization and improvement in speech perception. 15. Emphasis on modulation of sensory in order to improving function of the nervous system.

In this research, Autism Rating Scale, Childhood Autism Rating Scale was(CARS) used to assess the severity of symptoms in children. CARS is a behavior rating scale intended to help diagnose autism. CARS was developed by Eric Schopler, 1"Robert J. Reichier, and 1"Barbara Rochen Renner. It was designed to help differentiate children with

autism from those with other developmental delays, such as mental retardation. Although there is no gold standard among rating scales in detecting autism, CARS is frequently used as part of the diagnostic process. Development of the CARS began in 1966 with the production of a scale that incorporated the criteria of Leo Kanner (1943) and Creak (1964), and characteristic symptoms of childhood autism. CARS is a diagnostic assessment method that rates children on a scale from one to four for various criteria, ranging from normal to severe, and yields a composite score ranging from non-autistic to mildly autistic, moderately autistic, or severely autistic. The scale is used to observe and subjectively rate fifteen items.

- relationship to people
- imitation
- emotional response
- body
- object use
- adaptation to change
- visual response
- listening response
- taste-smell-touch response and use
- fear and nervousness
- verbal communication
- non-verbal communication
- activity level
- level and consistency of intellectual response
- general impressions

This scale (CARS) can be completed by a clinician or teacher or parent, based on subjective observations of the child's behavior. Each of the fifteen criteria listed above is rated with a 7-point score. Lower scores indicate less severity of Autism. Total CARS score indicates total score of severity about Autism Spectrum Disorders(ASD) (30-32). Data analysis was done using ANCOVA, ANOVA tests and ($P<0.05$) was considered significant.

Results

In this study, 33 girls and 117 boys participated. Average age of the first group who were treated for one year, was (4.84 ± 1.92), The second group of children were treated for two years the average age was (6.02 ± 2.86), and for third group that were treated for two years, the mean was(5.24 ± 2.69).

Mean and standard deviation scores of the subjects in the first group in (Table1), and repeated measures ANOVA results are shown in (Table2).

Table 1: Mean scores CARS subjects, at baseline and one year after treatment

CARS score	Mean	SD
Baseline	49.74	6.58
Firs year	36.87	7.99

Table 2: Results of ANOVA with repeated measures after one year of treatment

The main effect	df	Df (error)	F	P. value	η2
Time	1	47	36.32	0.000	0.436
Gender×Time	1	47	2.23	0.142	0.045
Age×Time	1	47	0.39	0.533	0.008

Results showed that the severity of the symptoms of autism spectrum disorders after one year of treatment, has been significantly reduced ($P=0.000$). There was no significant difference between sexes and various ages in reducing the severity of PTSD symptoms of autism spectrum, after one year of treatment ($P>0.05$).

Mean and standard deviation scores of the subjects in the second group in (Table3), and repeated measures ANOVA results are shown in (Table4).

Table 3: Mean scores CARS subjects, at baseline and two years after treatment

CARS score	Mean	SD
Baseline	47.43	8.06
Firs year	38.95	9.40
Second year	32.43	10.65

Table 4: Results of ANOVA with repeated measures after two years of treatment

The main effect	df	Df (error)	F	P. value	η2
Time	2	94	21.50	0.000	0.314
Gender×Time	2	94	1.281	0.283	0.027
Age×Time	2	94	1.001	0.371	0.021

Results showed that the severity of the symptoms of ASD after two years of treatment, has been significantly reduced (P=0.000). There was no significant difference between sexes and various ages in reducing the severity of PTSD symptoms of autism spectrum, after two years of treatment (P>0.05).

Also mean and standard deviation scores of the Patients in the third group in (Table5), and repeated measures ANOVA results are shown in (Table 6).

Table 5: Mean scores CARS subjects, at baseline and three years after treatment.

CARS score	Mean	SD
Baseline	51.98	7.00
Firs year	43.42	8.11
Second year	37.00	9.12
Third year	30.53	10.30

Table 6: Results of ANOVA with repeated measures after three years of treatment.

The main effect	df	df (error)	F	P.value	η2
Time	3	141	27.32	0.000	0.368
Gender×Time	3	141	0.436	0.728	0.009
Age×Time	3	141	0.481	0.696	0.01

Results showed that the severity of the symptoms of ASD after three years of treatment, has been significantly reduced (P=0.000). There was no significant difference between sexes and various ages in reducing the severity of PTSD symptoms of autism spectrum, after three years of treatment (P>0.05).

On the other hand, (Tables 1,3 and 5) show that the severity of the symptoms of ASD with increasing time of treatment, was further reduced. In other words, the severity of ASD symptoms, in children who were treated with HMTM for three years, compared with the other two groups (those who had treated one or two years), is further decreased.

Evaluate the recovery rate of children in each group, showed (26%) of patients after one year of treatment, (44%) after two years and (52%) after three years of treatment have improved.

Conclusion

The results of this study showed the Holistic Multi-dimensional Treatment Model (HMTM), is a comprehensive treatment patterns, that can effectively treat children with disorders of the spectrum itself is retained. The results of this study showed, although the recovery rate of children who have been treated more time with this method is higher, despite there was not significant difference in reducing the signs of autism in children who were treated for 3 years, with children who had been treated with one or two years.

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