

Use of Acupuncture in the Management of Attention Deficit Hyperactivity Disorder

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Abstract

Background: Our aim was to evaluate the effectiveness of acupuncture therapy as complementary medicine tool in the management of children with Attention Deficit Hyperactivity Disorder.

Methods: We performed the study on 50 ADHD patients of any subtype, with no psychiatric or medical comorbidity. EEG and TIQ were done to all patients before the start of acupuncture therapy to exclude epilepsy and mental retardation, Conners Rating Scale was done to all patients before and after acupuncture therapy. Patients were divided into two groups, group (I): received acupuncture therapy with pharmacotherapy, group (II): received acupuncture therapy only. The two groups were compared as regard the hyperactivity, impulsivity, and inattention parameters on Conners Rating Scale.

Results: Treatment efficacy of acupuncture therapy for ADHD patients using Conner's parent questioner was 88% of the studied group who showed improvement with variable degrees while 12% of the studied group, showed no improvement, all patients below 8 years show improvement (100%), while >8 years (70%) with (p value< 0.001 HS), acupuncture was more effective in the hyperactive /impulsive subtype, the 12 patients showed improvement (100%), followed by combined type 26 patients, with improved 22 (84%), then the inattentive type 12 patients, with improved 10 (83%) with (P value< 0.05 S.).

Conclusion: This cross sectional interventional study provides a scientific evidence for the efficacy of acupuncture therapy in the management of children with Attention Deficit Hyperactivity Disorder. Acupuncture therapy improves the core symptoms of ADHD which are hyperactivity, impulsivity and inattention with efficacy rate up to 88%.

Acupuncture therapy provides a successful complementary medicine tool in the management of children with ADHD with a high success rate and safe method free from side effects.

Keywords: Acupuncture, ADHD management, complementary medicine.

استخدام الإبر الصينية في علاج الأطفال الذين يعانون من فرط الحركة وقلة الانتباه

الخلفية: الهدف من هذه الدراسة تقييم الكفاءة العلاجية للإبر الصينية كأحد وسائل الطب التكميلي في علاج الأطفال الذين يعانون من اضطراب فرط الحركة وقلة الانتباه.

الأساليب: أجريت هذه الدراسة على 50 مريض من أي نوع فرعي لاضطراب فرط الحركة وقلة الانتباه ADHD تم تشخيصهم وفقاً للدلائل التشخيصية والإحصائية للاضطرابات النفسية DSM V مع عدم وجود أي اضطرابات نفسية مشتركة مع اضطراب فرط الحركة وقلة الانتباه، لذلك تم عمل اختبار نكاه TIQ لجميع المرضى قبل بدء الدراسة لاستبعاد وجود تأخر عقلي وعمل رسم مخ ECG لجميع المرضى لاستبعاد وجود صرع، تم عمل اختبار Conner's Rating Scale لجميع المرضى قبل وبعد بروتوكول العلاج بالإبر الصينية. كما تم تقسيم المرضى إلى مجموعتين: مجموعة تم علاجها بالإبر الصينية مضافاً إلى العلاج الدوائي المتبع، مجموعة أخرى تم علاجها بالإبر الصينية فقط تم مقارنة نتائج اختبار Conner's Rating Scale بين مجموعتي البحث.

النتائج: أوضحت هذه الدراسة فاعلية العلاج بالإبر الصينية لمرضى اضطراب فرط الحركة وقلة الانتباه وظهر ذلك التحسن بنسبة 88% بدرجات متفاوتة في حين أن 12% من المرضى موضوع البحث لم يظهروا أي تحسن، كما أظهرت الدراسة فاعلية العلاج بالإبر الصينية في المرضى الأقل من 8 سنوات بنسبة تحسن 100%، في حين المرض الأكبر من 8 سنوات كانت نسبة التحسن 70%. كما أظهرت الدراسة فاعلية الإبر الصينية في علاج النوع الأول وهو اضطراب فرط الحركة بنسبة 100%، و12 مريض وبليه النوع المختلط فرط الحركة والانفعال مع قلة الانتباه بنسبة 84%، وأخيراً نوع اضطراب نقص الانتباه بنسبة 83% مريض. يتضح من هذا البحث أن الإبر الصينية أظهرت تحسن في الأعراض الأساسية لاضطراب فرط ADHD وهي فرط الحركة، والانفعال وقلة الانتباه بنسبة نجاح عالية تصل إلى 88% من المرضى موضوع البحث.

الخلاصة: أظهرت هذه الدراسة الكفاءة العلاجية للإبر الصينية كأحد وسائل الطب التكميلي في علاج اضطراب فرط الحركة وقلة الانتباه، وسيلة آمنة خالية من أي آثار جانبية.

كلمات البحث: الوخز بالإبر الصينية واضطراب فرط الحركة وقلة الانتباه، الطب التكميلي.

Introduction:

Attention Deficit Hyperactivity Disorder (ADHD), is a neurodevelopmental psychiatric disorder (Sroubek et.al., 2013) in which there are significant problems with executive functions (e.g., attentional control and inhibitory control) that cause attention deficits, hyperactivity, or impulsiveness which is not appropriate for a person's age (Diamond A., 2013) These symptoms must begin by age six to twelve and persist for more than six months for a diagnosis to be made. In school-aged individuals inattention symptoms often result in poor school performance (National Center on Birth Defects and Developmental Disabilities, 2014)

The cause of most cases of ADHD is unknown; however, it is believed to involve interactions between genetic and environmental factors (Thapar et.al., 2013). Management of ADHD typically involves behavioral therapy or medications either alone or in combination. While treatment may improve long-term outcomes, it does not get rid of negative outcomes entirely (Shaw M. et.al., 2012). Medications used include stimulants, atomoxetine, alpha-2 adrenergic receptor agonists, and sometimes antidepressants (Bidwell et.al., 2011). Since the origin of ADHD is unclear which limit the pharmacological effectiveness and makes adverse effects common (Hong and Cho et.al., 2011) researchers are developing more effective treatments and interventions, and new tools to treat and/or prevent it (National Institute of Mental Health NIH, 2012)

The use of CAM therapies has increased especially for developmental and behavioral disorders such as ADHD (Hong and Cho, 2011) As part of Complementary Medicine, acupuncture is found to be the most stable and effective treatment for children with ADHD (Simon and Becker, 2007). Acupuncture therapy has been applied to various psychiatric diseases, since acupuncture stimulation might affect brain activity and brain hemodynamics (Hori et.al., 2010). Acupuncture is reported to be relatively simple, safe and inexpensive treatment compared to other conventional interventions, it has been widely used to improve the core symptoms of ADHD (Li et.al., 2011)

Aim of The Study:

This study was designed to evaluate the effectiveness of Acupuncture as an complementary medicine tool in the management of children with Attention Deficit Hyperactivity Disorder (ADHD).

Hypothesis:

It was hypothesized that acupuncture therapy is effective as a complementary medicine modality in the management of children with ADHD.

Patients and Methods:

This study was conducted upon 50 patients having a diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) of any sub-type according to Diagnostic and Statistical Manual of Mental Disorder (DSM IV), 44 boys (88%) and 6 girls (12%) their ages ranged between 6 and 12 years with a mean value of 8.0 ± 1.41

The children were recruited from both Psychiatric Outpatient Clinics of children with special needs care in the Institute of Post Graduate Childhood Studies, Ain Shams University, and a Acupuncture Outpatient Clinic in National Research Centre (NRC).

1. Inclusion Criteria: ADHD patients with age range 6- 10 years old diagnosed by the fourth edition of Diagnostic and Statistical Manual of Mental Disorders (DSM IV) on the basis of observation of the child of the

same social class.

2. Exclusion Criteria

- a. Patients with psychiatric comorbidity with ADHD except learning disorders.
- b. Patients With Medical Comorbidity:
 - ⌘ Patients With Mental Retardation.
 - ⌘ Patients With Epilepsy.
 - ⌘ Patients with chronic medical illness.

Approval of the Medical Ethical Committees of both the Institute of Postgraduate Childhood Studies, Ain Shams University and National Research Centre were taken first. Also a written consent was taken from all patient's guardians prior to the study.

Methods:

All patients were subjected to the following:

1. Full history taking with emphasis on:
 - a. Symptoms and signs of ADHD.
 - b. Current medical treatment as regard type (pharmacotherapy-behavioral therapy) and duration of treatment.
2. Thorough Clinical Examination:
 - a. General examination, including anthropometric measurements (weight, height).
 - b. Special Examination
 - c. Psychiatric examination were done by psychiatrist to confirm the diagnosis of ADHD according to DSM IV criteria. (Hong and Cho, 2011).
3. Investigations were done the form of:
 - a. Intelligence quotient (IQ) test for all patients before the start of acupuncture therapy to exclude mental retardation (Hong and Cho, 2011).
 - b. EEG was done for all patients to exclude epilepsy.
 - c. Revised Conner's parent rating scale to assess the severity of the core symptoms (inattention, impulsivity and hyperactivity) (Li et.al., 2011).
4. Acupuncture Therapy Steps:
 - a. Positioning: Patients are asked to take the most comfortable position before starting the session, because the treatment requires patients to maintain that position for (20- 30) minutes. (Hou et.al., 2006)
 - b. Disposable sterile, stainless steel acupuncture needles of 13- 25mm in length and 0.25 mm in diameter are used. (Hong and Cho, 2011).
 - c. Acupoints are cleaned with alcohol 70%. (Hong and Cho, 2011)
 - d. Needles are inserted into a depth of approximately (0.3- 0.5 B- Cun: head, 0.3 B- Cun: arms and legs 0.5 B Cun) Until a characteristic "de qi" sensation is obtained i.e. a characteristic slightly painful or distending sensation. (Hong and Cho, 2011).
On the scalp, the needles were inserted horizontally to about one inch depth. On the body, they were inserted perpendicular (Simon and Becker, 2007).
After "De qi" is felt by the patient, needles are retained for 20- 30 minutes without manipulation (Hong and Cho, 2011).
 - e. Needles are removed using a clean, dry cotton ball to close the hole (Hou, 2006).
 - f. Acupoints used in each session: Traditional Chinese Medicine points (TCM) points:

✎ Scalp points Baihui GV 20 (Du20) & Sishencong (Ex- HN1) 4 (Hong and Cho, 2011 & He et al., 2014).

1. Body Points:

- ✎ Large intestine meridian, Hegu LI4 (bilateral) (Hong and Cho, 2011).
- ✎ Quchi LI11 (Bilateral) (Hong and Cho, 2011).
- ✎ Spleen meridian, San Yin Jiao (SP- 6), (bilateral) (Hong and Cho, 2011).
- ✎ Liver meridian, Taichong (LR- 3), (bilateral)

✎ Yamamoto New Scalp Acupuncture (YNSA) points selected:

1. Three temple needles (i.e. group of three points 2Cun directly above the ear apex and 1Cun anterior and posterior to the first point).
 - ✎ Naohu [Gv 17].
 - ✎ Nao Kong [Gv 19].
 - ✎ Nie San Zhen. (Simon and Becker, 2007)
2. Brain points: five points on the anterior hair line (He et al., 2014)

Acupuncture protocol was applied to the 50 patients continued, with their existing program (i.e. acupuncture protocol was added to their regimen) (Hong and Cho, 2011).

All patients received 12 acupuncture sessions, two times per week for 6 weeks each session takes from 20- 30 minutes (Hong and Cho, 2011).

The ADHD studied patients were divided into two groups:

- ✎ Group I: Received pharmacotherapy with acupuncture therapy (n= 38 patients).
- ✎ Group II: Received acupuncture therapy only (n= 12 patients).

The two groups are compared as regard hyperactivity, impulsivity and inattention scores on Conner's Rating Scale. Results

Table (1) Distribution of the studied groups as regard ADHD (sub- types) as described by DSM V

Diagnosis Of ADHD	No.	%
Hyperactive Impulsive Type	12	24
Inattentive Type	12	24
Combined Type	26	52

Table (1) shows that 52% of the studied group of (ADHD) patients were of subtype, 24% of Hyperactive subtype and 24% of inattentive subtype.

Table (2) Distribution of the studied patients as regard effect of acupuncture therapy as evaluated by Conners Rating Scale

Treatment Effect	No.	%
Improved	44	88
No Improvement	6	12
Total	50	100

Table (2) shows that (88%) of the studied ADHD patients showed improvement after acupuncture therapy and 12% showed no improvement using Conners Rating Scale.

Table (3) Comparison between ages of the studied group as regard acupuncture therapy effect as evaluated by Conners Rating Scale.

Age (Years)	Acupuncture Therapy Effect				Chi- Square Test	
	Improved		No Improvement		x ²	P- Value
	No.	%	No.	%		
<= 8 Years	30	100.00	0	0.00	10.227	<0.001
>8 Years	14	70.00	6	30.00		
Total	44	88.00	6	12.00		

Table (3) shows highly statistically significant difference between the age of the studied group as regard the treatment effect, as patients < 8yrs showed

100% improvement, using Chi- square, with p- value < 0.001 HS.

Table (4) Comparison between boys and girls as regard acupuncture therapy effect as evaluated by Conners Rating Scale.

Sex	Acupuncture Therapy Effect				Chi- Square Test	
	Improved		No Improvement		x ²	P- Value
	No.	%	No.	%		
Boys	40	90.91	4	9.09	2.938	0.046
Girls	4	66.67	2	33.33		
Total	44	88.00	6	12.00		

Table (4) shows statistically significant difference between boys and girls as regard acupuncture therapy effect as 90% of boys showed improvement, using Chi- square, with p- value < 0.05 S.

Table (5) Comparison between acupuncture therapy effects as evaluated by Conners Rating Scale and anthropometric measurements.

Anthropometric Measurement	Improved		No Improvement		T- Test	
	Mean	±Sd	Mean	±Sd	t	P- Value
Wt. For Age	25.80	4.69	40.27	3.49	- 7.25	<0.001
Ht. For Age	124.64	10.11	138.33	2.73	- 3.28	<0.001

Table (5) shows highly statistically significant difference between anthropometric measurements as regard acupuncture therapy effect as improved patients with mean wt for age 25.8 and mean Ht for age 124.6, using Independent Sample t- test, with p- value < 0.001 HS.

Table (6) comparison between ADHD subtypes as regard effect of acupuncture therapy as evaluated by Conners Rating Scale

ADHD	Treatment Effect				Chi- Square Test	
	Improved		No Improvement		x ²	P- Value
	No.	%	No.	%		
Hyperactive Impulsive	12	100.00	0	0.00	4.166	0.039
Inattentive	10	83.33	2	16.67		
combined	22	84.62	4	15.38		
Total	44	88.00	6	12.00		

Table (6) shows statistically significant difference between ADHD subtypes as regard acupuncture therapy effect as 100% of hyperactive/ impulsive subtype showed improvement, Using Chi- square test, with p- value < 0.05 S.

Table (7) Comparison between Conner's Rating Scale score of hyperactivity before and after acupuncture therapy

Conners Scale (Hyper Activity)	Before		After		Chi- Square Test	
	No.	%	No.	%	x ²	P- Value
Average	12	24	12	24	40.182	<0.001 (HS)
Slightly	0	0	6	12		
Mild	0	0	16	32		
Moderate	12	24	12	24		
Marked	26	52	4	8		

Table (7) shows highly statistically significant improvement of hyperactivity on Conners Rating Scale between before and after acupuncture therapy as 26 patients with marked hyperactivity before acupuncture therapy, and only 4 after acupuncture therapy, using chi- square test with p-value < 0.001

Table (8) Comparison between Conner's Rating Scale score of inattention before and after acupuncture therapy course

Conners Scale (Inattention)	Before		After		Chi- Square Test	
	No.	%	No.	%	x ²	P- Value
Average	8	16	14	28	8.708	0.049 (S)
Slightly	4	8	10	20		
Mild	4	8	4	8		
Moderate	12	24	12	24		
Marked	22	44	10	20		

Table (8) shows statistically significant improvement as regard inattention on Conners Rating Scale before and after acupuncture therapy, as 22 patients

with marked inattention before acupuncture therapy, and only 10 after acupuncture therapy, using Chi-square test p-value 0.049.

Table (9) Comparison between Conner's Rating Scale score of hyperactivity/ impulsivity before and after acupuncture therapy

Hyperactivity And Impulsivity	Before		After		Chi-Square Test	
	No.	%	No.	%	χ^2	P-Value
Average	12	24	12	24	31.086	<0.001 (HS)
Slightly	0	0	4	8		
Mild	2	4	18	36		
Moderate	12	24	12	24		
Marked	24	48	4	8		

Table (9) shows highly statistically significant improvement in hyperactivity/ impulsivity on Conner's Rating Scale before and after acupuncture therapy, as 24 patients with marked hyperactivity/impulsivity before acupuncture therapy and only 4 after acupuncture therapy.

Table (10): Comparison between group (I) receiving pharmacotherapy with acupuncture therapy and group (II) receiving only acupuncture therapy as regard hyperactivity parameter on Conners Rating Scale. before and after acupuncture therapy.

Hyper Activity On Conners	Group (I) with medical treatment+ acupuncture		Group (II) No medical treatment (only acupuncture)		p- value (before)	p- value (after)
	Before	After	Before	After		
Average	6	6	6	6	0.049	0.111
Slightly	0	4	0	2		
Mild	0	14	0	2		
Moderate	8	10	2	2		
Marked	24	4	4	0		
Total	38	38	12	12		

Table (10) shows statistically significant difference between group (I) treatment and group (II) treatment as regard hyperactivity parameter on Conners Rating Scale before start of acupuncture therapy. 24 patients with marked score in group (I), and 4 patients in group (II) No statistically significant difference between group (I) treatment and group (II) treatment as regard hyperactivity parameter on Conners Rating Scale after acupuncture therapy. 4 patients with marked score in group (I), and 0 patients in group (II)

Table (11) Comparison between group (I) receiving pharmacotherapy with acupuncture therapy and group (II) receiving only acupuncture therapy as regard inattention parameter on Conners Rating Scale before and after acupuncture therapy

Inattention On Conners	Group (I) with medical treatment+ acupuncture		Group (II) No medical treatment (only acupuncture)		p- value (before)	p- value (after)
	Before	After	Before	After		
Average	8	12	0	2	0.047	0.565
Slightly	4	8	0	2		
Mild	4	2	0	2		
Moderate	6	8	6	4		
Marked	16	8	6	2		
Total	38	38	12	12		

Table (11) shows statistically significant difference between group (I) treatment and group (II) treatment as regard inattention parameter on Conners Rating Scale before starting acupuncture therapy. 16 patients with marked score in group (I), and only 6 in group (II) No statistically significant difference between group (I) treatment and group (II) no treatment as regard inattention parameter on Conners Rating Scale after acupuncture therapy course. 8 patients with marked score in group (I), and 6 in group (II).

Table (12) Comparison between group (I) receiving pharmacotherapy with acupuncture therapy and group (II) receiving only acupuncture therapy as regard hyperactivity and impulsivity parameter on Conners Rating Scale before and after acupuncture therapy

Hyperactivity and impulsivity on Conners (before)	Group (I) with medical treatment + acupuncture		Group (II) No treatment (only acupuncture)		p- value (before)	p- value (after)
	No.	%	No.	%		
Average	6	6	6	6	0.031	0.118
Slightly	0	4	0	0		
Mild	2	14	0	4		
Moderate	8	10	4	2		
Marked	0	4	0	0		
Total	38	38	12	12		

Table (12) shows statistically significant difference between group (I) treatment and group (II) treatment as regard hyperactivity and impulsivity parameter on Conners Rating Scale before starting acupuncture therapy. 8 moderate score patients in group (I), and 4 in group (II) No statistically significant difference between group (I) treatment and group (II) no treatment as regard hyperactivity and impulsivity on Conners Rating Scale after acupuncture therapy course. 10 patients with moderate score in group (I), and 2 patients in group (II).

Table (13) Comparison between group (I) receiving pharmacotherapy with acupuncture therapy and group (II) receiving only acupuncture therapy as regard Conners Rating Scale parameter scores before and after acupuncture therapy

		Group (I) with medical treatment + acupuncture		Group (II) No treatment (only acupuncture)		T- Test	
		Mean	±Sd	Mean	±Sd	t	P- Value
Hyper Activity	Before	72.37	10.87	59.50	12.25	3.469	0.021
	After	63.00	9.35	54.17	9.90	2.815	0.057
Inattention	Before	68.53	11.27	73.50	6.40	-1.450	0.036
	After	62.53	11.39	65.17	7.44	-0.751	0.456
Hyperactivity And Impulsivity	Before	68.74	10.63	58.50	13.51	2.722	0.009
	After	62.63	9.58	54.00	10.58	2.654	0.074

This table (13) shows statistically significant difference between group (I) treatment and group (II) treatment as regard Conners Rating Scale before as mean hyperactivity score before is 72.3 in group (I) and 59.5 in group (II), while after non significant with mean score of hyperactivity 63.0 in group (I) and 54.1 in group (II).

Table (14) Comparison between family history of psychiatric disorder regarding acupuncture therapy effect as evaluated by Conners Rating Scale

F.H. Of psychiatric disorder	Acupuncture Therapy Effect				Chi- Square Test	
	Improved		No Improvement		χ^2	P- Value
	No.	%	No.	%		
Positive	23	82.14	5	17.86	4.056	0.037
Negative	21	75.00	1	4.55		
Total	44	157.14	6	13.64		

Table (14) shows statistically significant difference between patients with positive and negative family history as regard acupuncture therapy effect as 5 patients out of 6 who showed no improvement with positive family history, Using Chi-square test, with p-value < 0.05 S.

Table (15) Comparison between presence and absence of perinatal problems regarding acupuncture therapy effect as evaluated by Conners Rating Scale and

Perinatal Problems	Acupuncture Therapy Effect				Chi- Square Test	
	Improved		No Improvement		χ^2	P- Value
	No.	%	No.	%		
Positive	14	77.78	4	22.22	2.783	0.025
Negative	30	93.75	2	6.25		
Total	44	88.00	6	12.00		

Table (15) shows statistically significant difference between positive and

negative perinatal problems as regard acupuncture therapy, as 93.75% of improved patients with negative family history. effect, Using Chi- square test, with p- value< 0.05 S.

Table (16) Correlation Study between Conners Rating Scale Parameters and total IQ scores in the studied group Using Pearson Correlation Coefficient Test

Conners Rating Scale	Total I. Q. Score%	
	r	P- Value
Hyper Activity (Before)	0.155	0.282
Hyper Activity (After)	0.119	0.409
Inattention (Before)	- 0.515	<0.001
Inattention (After)	- 0.534	<0.001
Hyperactivity and impulsivity (before)	0.252	0.077
Hyperactivity and impulsivity (after)	0.189	0.188

Table (16) shows negative correlation and significant between total IQ score, and inattention parameter on Conners Rating scale before and after acupuncture therapy. With p value< 0.001

Discussion:

ADHD is a common neuropsychiatric problem affecting 7- 9% of children, the defining features of ADHD are inattention hyperactivity and impulsivity (Hong and Cho, 2011).

These behavioral manifestations contribute to diminished academic, occupational and social functioning (De Lafunte, 2013).

Pharmacological interventions are widely used with behavioral treatment in ADHD, since the origin of ADHD is still unclear limiting the pharmacological effectiveness and making adverse effects common (Chan, 2002).

Also, current medications do not cure ADHD, rather they control the symptoms for as long as they are taken (National Institute of Mental Health, 2012).

Complementary Medicine modalities (CAM) offer many alternatives to conventional medications. Acupuncture is reported to be a relatively simple, inexpensive and safe treatment compared to other conventional interventions (Li et.al., 2011).

Acupuncture is the practice of inserting needles into certain points in the body for therapeutic purposes. Needles used for acupuncture are most commonly made of sterilized stainless steel designed for single use. The needles may be stimulated further after insertion by manual movement, heat or electricity (Nasir, 2002).

The current study was designed to evaluate the effectiveness of acupuncture as a complementary medicine tool in the treatment of children with Attention Deficit Hyperactivity Disorder (ADHD).

The study was conducted upon 50 ADHD patients of any sub- type (44 males and 6 females) with mean age 8±1yr, diagnosed by DSMIV criteria same as Hong and Cho. (2011), who had used DSM IV ADHD diagnostic criteria to establish the diagnosis of ADHD. Also, (Li et.al., 2011), and (Simon and Becker, 2007).

Based on Traditional Chinese Medicine (TCM) theory in explaining ADHD symptoms, proposing that the clinical symptoms of ADHD could be interpreted by the YIN- YANG disharmony theory in which hyperactivity is due to deficiency of Yin or excess Yang, and acupuncture treatment strategy should be directed to enrich the Yin and down beat Yang to restore the balance (Li et.al., 2011).

In the current study we selected some acupoints such as, head points GV20 with Ex- HN1, SP6 and Li 11 to restore the balance between the yin and

yang.

Similarly (Hong and Cho, 2011) used LI 11 to eliminate the excess Yang and SP 6 to supplements the insufficient Yin.

In current study we selected, also, YANSA points to like the three temple needles to control hyperactivity behavior, and Brain points (Ms5' & Ms8) to improve the inattention.

Similarly He et.al., (2014) had chosen the brain points, while Simon and Becker, (2007) used the three temple needles to repress hyperactivity.

Two acupuncture group points: body group points and scalp group points. The body group points correspond to the input system; the scalp group points correspond to the output system. The treatment mechanism is not completely understood, but both group points may, through metal needles, cause local irritation and/or stimulate the local tissues or cells that release substances such as bradykinin, substance P and prostaglandin. These biochemicals then sensitize or activate the cellular membrane potentials. When sufficient potentials are built up, an action potential is triggered or generated that will be through two systems: 1. Input system: from nerve ending transmit signals via axons to the spinal cord, and then to the upper part of the brain. 2. Output system: responds appropriately through conductive tissues to the front cortex and/or sensory neuron (Hou et.al., 2006). Acupuncture can change brain activity. A brain hemodynamic study conducted in Japan reported that acupuncture significantly decreased activity in the dorsomedial prefrontal cortex (DMPFC). Hyperactivity in the DMPFC is associated with various psychiatric diseases with socio- emotional disturbances such as schizophrenia and ADHD. A fluorodeoxyglucose positron emission tomography combined computed tomography (FDG- PET/CT) study in Korea reported changes in brain glucose metabolism in specific brain areas following stimulation by acupuncture. Collectively, these findings suggest that acupuncture effective to treat ADHD (Hong and Cho, 2011).

In the present study our selected 50 ADHD patients constituted of 44 boys (88%) and 6 girls (12%) Zhang (2000), had performed a study on 88 ADHD patients (71 boys and 16 girls).

Also Xu (2007), had performed a study on 115 ADHD patients (116 boys and 39 girls).

In agreement with this Willcutt et.al., (2012) had reported that ADHD has higher prevalence in males.

Regarding family history in the current study 56% of the studied group of ADHD patients showed +ve family history and 44% showed- ve family history this runs in parallel with genetic researches done by Franke et.al. (2012) who found that hyperactivity tends to aggregate in families also, increased rates of ADHD among parents and siblings of ADHD children have been observed.

Also, twin studies in many different countries show high heritability, rates for ADHD, of around 71- 90% (Nikolas & Burt, 2010), with evidence of shared familial/ inherited risks of combined and inattentive type symptoms (Willcutt et.al., 2012).

As regard ADHD subtypes the current study showed that the combined inattentive hyperactive /impulsive subtype was the most common subtype represented 52% of the studied patients the inattentive subtype 24% and hyperactive impulsive subtype 24%.

Supporting this result Wilnes et.al., (2009) reported that combined ADHD subtype (by DSM V) is generally considered the most prevalent in age groups.

In Simon (2007) study the combined subtype represented 44.5% the

inattentive subtype represented 31.6% and the hyperactive /impulsive subtype represented 23.8% of the studied ADHD patients.

In this study the treatment efficacy of acupuncture therapy for ADHD patients using Conner's parent questioner was 88% of the studied group who showed improvement with variable degrees while 12% of the studied group, showed no improvement (He et.al., 2014), who also used Conner's behavioral questioner achieved effective rate of 91.5% in the observation group which received combined therapy of scalp acupuncture and EEG biofeedback a compared with the control group that received only simple biofeedback therapy with treatment efficacy of 83%.

In (Hong and Cho, 2011), study the acupuncture treatment efficacy was 95% confidence interval using the (K- ADHD- RS, Korean version of Conners, Parent Rating Scale).

Simon and Becker (2007) had used the diagnostic symptoms listed in the DSM IV to evaluate the efficacy of acupuncture therapy which was 82.58% of the studied group. In the current study regarding the relation between the acupuncture therapy effect and the age of the studied group, the efficacy of acupuncture therapy was higher in children below 8 yrs compared to older children with highly statistically significant difference (p-value < 0.001 HS).

Similarly (Simon and Becker, 2007), found that acupuncture was more effective in younger children than in older patients. The author explains this by the fact that the cerebrum in younger children is still developing at much higher rate than in older children and that therefore, the intervention caused by the insertion of needles on the scalp is more able to regulate the brain's function after by age 12 the cerebrum has already reached adult level shape and form. Hence, the regulatory functions that acupuncture can exert are more limited.

In the current study it was found that the effect of acupuncture therapy was much higher in boys than girls with statistically significant difference (p value < 0.05), this is could be due to the bigger male sample. Also in the present study the hyperactive impulsive ADHD subtype was confined to male patients.

Also (Simon and Becker, 2007). mentioned that acupuncture therapy was most effective in the treatment of the hyperactive impulsive subtype.

The present research found a statistically significant relation between the efficacy of acupuncture therapy and the anthropometric measurements (Wt. for age and Ht. for age), this correlations runs in parallel with our results before that acupuncture therapy was more effective in younger age with their proportionate low Wt. and Ht.

Comparing the acupuncture therapy effect between different subtypes of ADHD, in our study in was found that the efficacy of acupuncture treatment was more evident in the hyperactive subtype followed by the mixed and inattentive subtype with statistically significant difference between the 3 subtypes (p-value < 0.05).

In agreement with our results (Simon and Becker, 2007) had found that acupuncture protocol was most effective in the treatment of the hyperactive impulsive subtype followed by the mixed subtype. Acupuncture was least effective in the treatment of the inattentive subtype with statistically significant difference between different ADHD subtypes (p-value < 0.001).

In the present study it was found. That there was a highly statistically significant improvement in hyperactivity and impulsivity scores on Conner's Rating Scale before and after acupuncture therapy with p-value < 0.001. While the inattentive score of Conner's shows only statistical improvement with (p-

value 0.049), these results run in parallel with (Simon and Becker, 2007), research who found that acupuncture seems to be much more effective to suppress the hyperactive behavior than to stimulate inattentive behavior.

In the present study dividing the studied ADHD patients into two groups, group (I): received medical treatment (pharmacotherapy) + acupuncture therapy, and group (II): received only acupuncture therapy. Comparing the two groups as regard Conners Rating Scale scores, it was found that there was no statistical difference in the improvement of the two groups as regard hyperactivity, impulsivity, and inattention parameters on Conners Rating Scale.

Similarly (Simon A and Becker, 2007) compared two groups of ADHD patients, group (I): received pharmacotherapy and, group (II): received acupuncture therapy, they found that the treatment effect in the acupuncture group was 82.58%, while the treatment effect in the pharmacotherapy group was 87%, so the treatment efficacy from the two different treatment protocols did not differ significantly (p > 0.05). These results give a scientific evidence that acupuncture could be a good alternative treatment method to medications used in ADHD management.

In this study the research found less efficacy acupuncture therapy among patients with positive family history (p-value < 0.05 S) this can be explained by the fact that the genetic predisposition of any disease makes the treatment more difficult e. g obesity, diabetes mellitus, as this genetic factor is considered as non- preventable or non- modifiable risk factor, so the environmental risk factors can be modified to control the disease combined with the treatment modality used, as the genetic risks can also influence susceptibility by altering individual sensitivity to environmental risks or protective factors (Thapar et.al., 2013)

In the present study, there was a less acupuncture therapy effect in patient with positive history for perinatal problems such as obstructed labor with prenatal hypoxia, prematurity, very low birth wt and NICU admission. Acupuncture therapy was more effective with ADHD patients who gave negative history for perinatal problems.

As hypoxia causes permanent brain insult, in a previous study by (Decker and Rye, 2002), who observed that the dopamine system is extensively sensitive to hypoxia, particularly in the fetus or infant thus any event pre- peri or postnatally that disrupt the flow of blood or oxygen to the brain might set the stage for later ADHD behaviors. This observation was supported both by laboratory studies: as done by (Decker and Rye, 2002), and a study of ex-premature infants who had documented cerebral ischemia at birth and were re-examined in early adolescence (Lou et.al., 2004).

In the current study there was a statistically significant negative correlation between the total IQ score and the inattention parameter on Conners Rating Scale after acupuncture therapy which means that acupuncture efficacy on the attention is better with higher total IQ scores.

There are well established strong association between lower IQ scores and intellectual disabilities that are attributed to the inattentive features of ADHD (Thapar et.al., 2013), which in turn influence the treatment efficacy.

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