ACUPUNCTURE FOR THE TREATMENT OF MILD OR MODERATE ASTHMA: A RANDOMIZED, PLACEBO-CONTROLLED CLINICAL TRIAL

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ABSTRACT

Objective: *Asthma is a chronic inflammatory disease seen with symptoms such as dyspnea, wheezing and crackling respiration. This study aimed to research the efficacy of acupuncture therapy in newly-diagnosed and untreated asthma patients.*

Material and Method: *A total of 123 asthma patients were included in this single-blinded study; 70 with mild asthma and 53 with moderate. Participants were randomly assigned into two groups. Acupuncture was applied to 62 patients and placebo (sham acupuncture) to 61 patients for a total of ten sessions. To measure the outcomes, FEV1, FVC, FEV1/FVC, PEF and FEF25-75 levels in respiratory function tests were used. For data analysis, Mann Whitney U-and Wilcoxon signed-rank tests were used.*

Results: *The post-treatment respiratory function test parameters of the acupuncture group and placebo group were determined as statistically significantly high compared to the pre-treatment values ($p<0.05$). When the mean differences between the pre and post-treatment values of the goups were compared, the mean differences of FEV1/FVC, PEF and FEF 25-75 values of the acupuncture group were seen to be statistically significantly higher than placebo group.*

Conclusion: *Acupuncture therapy seems to be effective in the treatment of patients with mild or moderate asthma.*

Keywords: *Asthma, acupuncture, respiratory function tests.*
Nobel Med 2016; 12(2): 31-37

HAFİF VEYA ORTA DERECELİ ASTIM TEDAVİSİNDE AKUPUNKTUR: RASTGELE PLASEBO-KONTROLLÜ KLİNİK BİR ÇALIŞMA

ÖZET

Giriş: Astım; dispne, wheezing ve öksürük gibi semptomlarla seyreden kronik inflamatuar bir hastalıktır. Bu çalışmanın amacı yeni tanı konmuş ve tedavi edilmemiş astım hastalarında akupunktur tedavisinin etkisini araştırmaktır.

Materyal ve Metot: Bu tek kör çalışma, 70 hafif ve 53 orta astım olmak üzere toplam 123 astım hastasını kapsıyordu. Katılımcılar rastgele iki gruba ayrıldı. Akupunktur, toplam 10 seans olarak 62 hasta ve plasebo 61 hastaya uygulandı. Sonuç ölçümleri için solunum fonksiyon testleri içinde FEV1, FVC, FEV1/FVC, PEF ve FEF25-75 düzeyleri kullanıldı. Veri analizi için, Mann Whitney U ve Wilcoxon signed-rank testleri uygulandı.

Bulgular: Tedavi sonrası akupunktur ve plasebo grubunun solunum fonksiyon testleri, tedavi öncesi değerlere göre anlamlı olarak yüksek bulundu ($p<0,05$). Grupların değerleri tedavi öncesi ve sonrası değerlendirildiğinde, akupunktur grubunun FEV1/FVC, PEF ve FEF-25-75 değerleri, plasebo grubundan istatistiksel olarak anlamlı bir şekilde yüksekti.

Sonuç: Hafif veya orta astımlı hastalarda akupunktur tedavisi etkili olabilir.

Anahtar kelimeler: Astım, akupunktur, solunum fonksiyon testleri. **Nobel Med 2016; 12(2): 31-37**

INTRODUCTION

Asthma is a chronic inflammatory disease in which many cells of the respiratory tract play a role. Chronic inflammation is evident with an excessive airway response causing recurrent wheezing, shortness of breath, a feeling of tightness in the chest and coughing attacks particularly at night and in the early morning. These generally extensive and variable attacks in the lungs, the majority of which recover spontaneously or with treatment, lead to obstruction of the airway.[1] To achieve control of asthma in treatment, requires careful observation of obtaining and maintaining control.[2] The controlling medications, through primarily anti-inflammatory effects to achieve clinical control of asthma, are long-term medications taken every day. Protective medications, which show a rapid recovery of symptoms and return of bronchoconstruction are medications which are taken as required.[3] Increased use of protective medications is a warning sign showing that asthma control is worsening and it is necessary to re-evaluate the treatment.[4] In addition, long-term use of these drugs leads to some systemic side-effects. The side-effects of steroids which are found in broncho-dilators in particular, are directing patients towards alternative medicine.[5] Davis *et al.*, reported that the inadequacy of classic drugs in asthma treatment has driven patients to alternative therapies.[4]

Table 1. Demographic distribution of the groups

		Groups						Chi square test	
		Acupuncture		Placebo		Total			
		n	%	n	%	n	%	Chi square	*p*
Gender	Female	48	80	35	58.3	83	69.2	5.627	0.018
	Male	12	20	25	41.7	37	30.8		
Age	20-29	6	10	7	11.7	13	10.8	0.46	0.977
	30-39	12	20	13	21.7	25	20.8		
	40-49	17	28.3	14	23.3	31	25.8		
	50-59	16	26.7	16	26.7	32	26.7		
	60-70	9	15	10	16.7	19	15.8		
Education	Uneducated	2	3.3	0	0	2	1.7	2.149	0.708
	Primary school	16	26.7	17	28.3	33	27.5		
	Secondary school	10	16.7	11	18.3	21	17.5		
	High school	22	36.7	21	35	43	35.8		
	University	10	16.7	11	18.3	21	17.5		
Occupation	Unemployed	0	0	0	0	0	0	2.61	0.456
	Housewife	32	53.3	24	40	56	46.7		
	Office worker	13	21.7	15	25	28	23.3		
	Worker	10	16.7	12	20	22	18.3		
	Retired	5	8.3	9	15	14	11.7		
Severity of Asthma	Mild	35	58.3	35	58.3	70	58.3	0.0001	1
	Moderate	25	41.7	25	41.7	50	41.7		
	Total	**60**	**100**	**60**	**100**	**120**	**100**		

The frequency of use of alternative treatment methods by asthma patients has been reported as 42-59 %, with the most commonly used method being acupuncture.[6-8] Although, there are many views that acupuncture is effective in asthma, there are very few findings supporting this. It has been reported that acupuncture as an additional treatment for asthma improves acute symptoms but does not achieve permanent treatment.[9] According to previous studies, it is thought that acupuncture is effective in allergic diseases by the activation of the hypothalamus-hypophysis-adrenal pathway leading to increased steroid production.[10] The immunological effects of acupuncture have been shown to be expected from measurements of various indicators of inflammation made with data obtained from extensive randomized studies.[10] In the present study, we aimed to investigate whether acupuncture has an effect on newly diagnosed and untreated mild and moderate asthma by comparing it with placebo.

MATERIAL AND METHOD

After obtaining approval of the local ethics committee (Ethic committee date: 11.7.2012, no: 3916), 123 patients between 20-70 years of age with mild (n=70) and moderate (n=53) asthma who were referred to the outpatient Chest Diseases Clinic, were included in this randomized, placebo-controlled clinical trial. All participants were informed, and written consents were taken.

The age, gender, education level, occupation and clinical information of the patients were recorded. Physical examination, pulmonary radiograph and respiratory function test were applied to all patients. The respiratory function tests were applied 3 times with 30-minute rest intervals using a Sensormedics Cardiopulmonary Exercise Testing device with the patient in a sitting position. The highest forced expiratory volumes in one second (FEV1) were recorded. In the reversibility respiratory function test, patients with a 12% increase in the FEV1 value after inhalation of B_2 agonist were diagnosed with asthma. The forced vital capacity (FVC), FEV1 and peak expiratory flow (PEF) values were measured according to the Global Initiative for Asthma (GINA) guidelines.[1] According to this, patients were included in the study who had never smoked and had not used any medications, and were newly diagnosed with mild asthma at 60-80 % of predictive FEV1 value or moderate asthma at 40-59%. Patients were excluded from the study if they smoked, used an asthma treatment regularly, had been treated with

a nebulizer for dyspnea at the emergency department within the previous month, had been admitted to hospital with a diagnosis of asthma within the previous 3 months, had experienced a respiratory tract infection within the last 6 weeks, had used oral or inhaler corticosteroid treatment within the previous month or had values of FEV1/FVC<70%.

Single-blind method was used for the intervention in this study and participants were randomly assigned, by using random sampling numbers, into two treatment groups of 60 patients each: acupuncture and placebo. The acupuncture group received Traditional Chinese Medicine acupuncture. Sham acupuncture was used for the placebo control in this study. It is a type of acupuncture in which needles of the same size as used in the treatment group are prevented from actually being inserted into the body, whether at traditional or nontraditional points. Same-size needles are retracted into the needle handle instead of penetrating the skin at the same points as the treatment group and the subject experiences a non-skin-penetrating pricking sensation instead of de qi. Thus the placebo and treatment groups were received sham acupuncture and acupuncture, respectively for a total of ten sessions by a licensed and experienced acupuncturist. Needles were applied to the patients after they had rested for 20 minutes in a darkened room. Sterile, disposable, 0.22x2 mm silver ear needles were inserted bilaterally in lung 7 and ear shenmen acupuncture points for three days. Body needles (0.25x25 mm silver body needles, Wujiang Jia Chan, Wujiang City, China) were inserted in LI 4 (08 cun), LU 9 (01 cun), LU 7 (02 cun), St36 (01 cun) and Lv3 (02 cun) points and were left for 20 min after de qi, a sensation of heaviness or soreness around the needle experienced by the subject, was obtained without manual or electrical stimulation. The points were selected by the acupuncturist according to the publication World Health Organization Standard Acupuncture Point Locations in the Western Pacific Region.[11] As this was a single-blinded trial the acupuncturist was not blinded when the tests were done. All patients were informed about exacerbation and rescue medications were prescribed to use in case of need.

All parameters of each groups were assessed at the end of the tenth session. Changes in FEV1 and FEV1/FVC values were considered as indicatives of response to treatment. No side effects were observed in any of the patients.

The data obtained in this study were evaluated using SPSS 20.0 software. In the evaluations between groups, when there was normal distribution, the Student's t-test was used and when distribution was not normal, the Mann Whitney U-test. The Paired t-test was used for the evaluation before and after the procedure. Results were considered significant at $p<0.05$

Table 2. The comprasions of respiratory function test parameters before and after intervention in acupuncture-placebo groups.

		Group								Significance*	
		n	Mean	Median	Min	Max	SD	95% Confidence Intervalfor Mean			
								Lower Bound	Upper Bound	t	p
preFEV1	Acupuncture	60	1.63	1.51	0.65	3.15	0.53	1.4881	1.7629	-2.23	0.027
	Placebo	60	1.82	1.84	0	3.58	0.6	1.6694	1.9769		
	Total	**120**	**1.72**	**1.67**	**0**	**3.58**	**0.57**	**1.6212**	**1.8275**		
preFVC	Acupuncture	60	2.29	2.14	0.91	4.16	0.78	2.0908	2.4952	-1.62	0.106
	Placebo	60	2.52	2.34	1.26	4.28	0.77	2.3245	2.7239		
	Total	**120**	**2.41**	**2.23**	**0.91**	**4.28**	**0.78**	**2.267**	**2.5502**		
preFEV1/FVC	Acupuncture	60	72.1	72.75	39.9	94.04	10.42	69.4124	74.7949	-1.02	0.311
	Placebo	60	73.94	73.35	59.2	100	9.27	71.5393	76.3307		
	Total	**120**	**73.02**	**72.75**	**39.9**	**100**	**9.86**	**71.2363**	**74.8023**		
prePEF	Acupuncture	60	3.68	3.42	1.9	8.07	1.35	3.3352	4.0325	-2.54	0.012
	Placebo	60	4.34	4.27	1.46	8.9	1.47	3.9588	4.7195		
	Total	**120**	**4.01**	**3.87**	**1.46**	**8.9**	**1.44**	**3.7504**	**4.2726**		
Pre FEF25-75	Acupuncture	60	1.41	1.23	0.51	3.31	0.64	1.2443	1.5744	-1.41	0.161
	Placebo	60	1.58	1.53	0.61	4.28	0.65	1.4077	1.7437		
	Total	**120**	**1.49**	**1.44**	**0.51**	**4.28**	**0.65**	**1.3755**	**1.6095**		
postFEV1	Acupuncture	60	1.79	1.72	0.65	3.14	0.58	1.6386	1.9387	-0.91	0.362
	Placebo	60	1.88	1.87	0.86	3.57	0.57	1.7374	2.0323		
	Total	**120**	**1.84**	**1.81**	**0.65**	**3.57**	**0.58**	**1.7327**	**1.9408**		
postFVC	Acupuncture	60	2.49	2.36	0.92	4.67	0.81	2.2828	2.7022	-0.44	0.661
	Placebo	60	2.56	2.34	1.25	4.27	0.8	2.3506	2.7644		
	Total	**120**	**2.53**	**2.34**	**0.92**	**4.67**	**0.8**	**2.3797**	**2.6703**		
postFEV1/FVC	Acupuncture	60	72.3	72.75	39.8	95.4	10.51	69.5872	75.0171	-0.88	0.378
	Placebo	60	73.9	73.35	59.4	99.8	9.23	71.5141	76.2832		
	Total	**120**	**73.1**	**72.75**	**39.8**	**99.8**	**9.88**	**71.3142**	**74.8866**		
postPEF	Acupuncture	60	3.9	3.65	1.91	8.06	1.43	3.5261	4.2666	-1.73	0.086
	Placebo	60	4.36	4.26	1.47	8.91	1.47	3.975	4.737		
	Total	**120**	**4.13**	**3.96**	**1.47**	**8.91**	**1.47**	**3.8611**	**4.3912**		
postFEF25-75	Acupuncture	60	1.56	1.5	0.5	3.3	0.68	1.388	1.7386	-0.34	0.729
	Placebo	60	1.61	1.55	0.62	4.27	0.66	1.4348	1.7768		
	Total	**120**	**1.58**	**1.54**	**0.5**	**4.27**	**0.67**	**1.4639**	**1.7053**		

*: Indipendent samples t-test, **FEV1:** forced expiratory volumes in one second, **FVC:** forced vital capacity, **PEF:** peak expiratory flow, **FEF25-75:** forced expiratory flow 25-75%

RESULTS

A total of 120 patients were included in the study, 70 with mild asthma and 50 with moderate asthma. Of the total participants, 69.2% were female and the most common age group was 50-59 years (26.7%). High school level of education was the group with the most participants (35.8%), 46.7% were housewives and

Table 3. The comprasions of respiratory function test parameters before and after intervention in acupuncture group.

		Parameters of before and after acupuncture									
		n	Mean	Median	Min	Max	SD	95% Confidence Intervalfor Mean		Significance*	
								Lower Bound	Upper Bound	t	p
Acupuncture	preFEV1	60	1.63	1.51	0.65	3.15	0.53	1.4881	1.7629	-3.91	<0.001
	postFEV1	60	1.79	1.72	0.65	3.14	0.58	2.0908	2.4952		
	preFVC	60	2.29	2.14	0.91	4.16	0.78	69.4124	74.7949	-4.18	<0.001
	postFVC	60	2.49	2.36	0.92	4.67	0.81	3.3352	4.0325		
	preFEV1/FVC	60	72.1	72.75	39.9	94.04	10.42	1.2443	1.5744	-2.65	0.011
	postFEV1/FVC	60	72.3	72.75	39.8	95.4	10.51	1.6386	1.9387		
	prePEF	60	3.68	3.42	1.9	8.07	1.35	2.2828	2.7022	-3.75	<0.001
	postPEF	60	3.9	3.65	1.91	8.06	1.43	69.5872	75.0171		
	preFEF25-75	60	1.41	1.23	0.51	3.31	0.64	3.5261	4.2666	-3.96	<0.001
	postFEF25-75	60	1.56	1.5	0.5	3.3	0.68	1.388	1.7386		
Placebo	preFEV1	60	1.82	1.84	0	3.58	0.6	1.6694	1.9769	-1.74	0.088
	postFEV1	60	1.88	1.87	0.86	3.57	0.57	2.3245	2.7239		
	preFVC	60	2.52	2.34	1.26	4.28	0.77	71.5393	76.3307	-1.53	0.131
	postFVC	60	2.56	2.34	1.25	4.27	0.8	3.9588	4.7195		
	preFEV1/FVC	60	73.94	73.35	59.2	100	9.27	1.4077	1.7437	-1.42	0.161
	postFEV1/FVC	60	73.9	73.35	59.4	99.8	9.23	1.7374	2.0323		
	prePEF	60	4.34	4.27	1.46	8.9	1.47	2.3506	2.7644	-1.08	0.286
	postPEF	60	4.36	4.26	1.47	8.91	1.47	71.5141	76.2832		
	preFEF25-75	60	1.58	1.53	0.61	4.28	0.65	3.975	4.737	-1.57	0.122
	postFEF25-75	60	1.61	1.55	0.62	4.27	0.66	1.4348	1.7768		

*: Paired samples t-test, **FEV1:** forced expiratory volumes in one second, **FVC:** forced vital capacity, **PEF:** peak expiratory flow, **FEF25-75:** forced expiratory flow 25-75%

the severity of the asthma was determined as mild in 58.3% and moderate in 41.7% (Table 1).

In the comparison of respiratory function parameters of the groups before and after the application of acupuncture and sham acupuncture, the pre-treatment FEV1 and PEF values of the placebo group were determined to be significantly higher than those of the acupuncture group (p=0.27, p=0.012 respectively). There was no statistically significant difference between the groups in respect of the other parameters (p>0.05). No statistically signficant difference was determined between the groups in the post-treatment values of any parameters, including FEV1 and PEF values (p>0.05).

When the intra-group evaluations were made, while a statistically significant increase was determined in the post-treatment respiratory function test parameters of the acupuncture group compared to the pre-treatment values (p<0.05), no statistically significant difference was determined in the pre and post-treatment values of the placebo group (Table 2).

When the pre and post-treatment respiratory function values of the groups were evaluated within themselves, while a statistically significant increase was seen in all the post-treatment parameters of the acupuncture group, there was no statistically significant difference between the pre and post-treatment values of the placebo group (Table 3).

When the mean differences between the pre and post-treatment values of the groups were compared, the mean differences of the FVC and forced expiratory flow 25-75% (FEF25-75) values in the acupuncture group were determined to be statistically significantly higher than placebo group. The differences in the FEV1, FEF1/FVC and PEF values are also higher in acupuncture group than placebo, however the differences were not statistically significant (Table 4).

DISCUSSION

In this study investigating the effect of acupuncture in the treatment of mild or moderate asthma, significant improvements were seen in the respiratory function parameters. When compared with placebo the increase in all parameters were greater in acupuncture group although not statistically significant. Only the mean differences in FEV1/FVC, PEF and FEF25-75 levels were statistically significantly high in acupuncture group. Complementary/alternative medicine (CAM) is commonly used by patients with chronic conditions including asthma. In Holland, 22% of physician practitioners have emphasized the importance of acupuncture in asthma treatment.[12] In a study conducted in Vienna of long-term asthma patients in an intensive care unit, it was reported that a significant improvement was achieved after 10 weeks of acupuncture treatment.[13] Fuller also reported that acupuncture was effective in the treatment of asthma and its use could be beneficial.[14]

The mechanism of the effect of acupuncture is not clear. Many studies of animals and humans have shown that acupuncture could be the cause of several biological responses. These responses may be close or distant to the field of application and reach several structures in the central nervous system primarily via sensory neurons. This leads to the activation of pathways affecting various physiological systems in the central nervous and peripheral systems. Regulation of central and peripheral blood flow has been reported in a change in the secretions of neurotransmitter and neurohormones in various sources.[15] It has been suggesed that the expression of adrenocorticoids is increased by stimulation of adrenocorticotropic hormone, vasoactive intestinal peptide or endorphins.[16] In some asthma patients, clinical and physiological improvement has

Table 4. The comprasions of mean differences of pre and post-treatment values between groups

		Group								Significance* Mann-Whitney U testi		
		n	Mean	Median	Min	Max	SD	95% Confidence Intervalfor Mean				
								Lower Bound	Upper Bound	Mean Rank	U	*p*
Difference FEV1	Acupuncture	60	0.16	0.01	-0.03	1.2	0.32	0.0796	0.2468	66.13		
	Placebo	60	0.06	0	-0.03	1.35	0.24	-0.001	0.1243	54.87	1462	0.069
	Total	**120**	**0.11**	**0**	**-0.03**	**1.35**	**0.29**	**0.0601**	**0.1647**			
Difference FVC	Acupuncture	60	0.2	0.01	-0.02	1.14	0.37	0.1039	0.2951	68.11		
	Placebo	60	0.03	0	-0.03	0.96	0.17	-0.0101	0.0768	52.89	1343.5	0.013
	Total	**120**	**0.12**	**0**	**-0.03**	**1.14**	**0.3**	**0.0625**	**0.1703**			
Difference FEV1/ FVC	Acupuncture	60	0.2	-0.1	-0.4	2.7	0.58	0.0484	0.3486	66.33		
	Placebo	60	-0.04	-0.1	-0.3	1	0.2	-0.0876	0.0149	54.68	1450.5	0.063
	Total	**120**	**0.08**	**-0.1**	**-0.4**	**2.7**	**0.45**	**0.0001**	**0.1621**			
Difference PEF	Acupuncture	60	0.21	-0.01	-0.02	1.51	0.44	0.0992	0.3258	62.52		
	Placebo	60	0.02	0	-0.2	0.79	0.12	-0.0145	0.0482	58.48	1679	0.509
	Total	**120**	**0.11**	**0**	**-0.2**	**1.51**	**0.34**	**0.0541**	**0.1752**			
Difference FEF25-75	Acupuncture	60	0.15	0.01	-0.03	0.93	0.3	0.0762	0.2318	66.74		
	Placebo	60	0.03	-0.01	-0.2	0.78	0.15	-0.0083	0.0687	54.26	1425.5	0.041
	Total	**120**	**0.09**	**0**	**-0.2**	**0.93**	**0.24**	**0.0479**	**0.1363**			

*: Mann-Whitney U-testi, **FEV1:** forced expiratory volumes in one second, **FVC:** forced vital capacity, **PEF:** peak expiratory flow, **FEF25-75:** forced expiratory flow 25-75%

been reported due to the immunomodulator effects of inflammatory cells and cytokines.[5] Joos *et al.* reported that acupuncture had a significant immunomodulator effect in asthma treatment.[17] Zhang *et al.* stated that the relationship of acupuncture to asthma and other diseases was related to the improvement of the autonomic nerve system activities.[18]

In a study by Collison in 1975, asthma was reported to be closely related to psychic factors.[19] Nowadays, although the psychotherapeutic role of acupuncture forms a part of the placebo effect in all treatments, it is evaluated as a holistic approach. There are studies which have reported that acupuncture has a placebo effect in asthma.[20] Establishing an effective and realistic placebo is a continuing challenge for acupuncture research. Therefore, in the current study which used sham acupuncture as a placebo, a significant improvement was determined in some parameters the acupuncture group compared to the placebo group. These results showed that real acupuncture was more effective than placebo acupuncture. This seems to refute the hypothesis that it has a placebo effect. It is certain that further studies are needed for definitive results.

In the first studies on this subject it was attempted to define the efficacy of acupuncture with clinical scores, but later more objective results were obtained with respiratory function tests.[9] Chu et al reported an immediate increase in the FEV1 response following acupuncture in patients with asthma and repeated acupuncture created a response similar to that of bronchodilator.[21] Yu *et al.* showed a short-term effect of acupuncture on asthma and Takishima *et al.* demonstrated that acupuncture made a short-term reduction on airway resistance.[22,23] Scheewe *et al.* found that with acupuncture, the peak expiratory flow variability differs significantly from that of the control patients' group, in a trial assessing the immediate effects of acupuncture as an add-on therapy in children and adolescents with bronchial asthma.[24] Similarly, Karlson *et al.* demonstrated that acupuncture had an effect on asthma in preschool children for the duration of the treatment course as assessed by subjective parameters and use of medication although the effect was not sustained beyond the treatment period.[25] In the current study, which was conducted with objective respiratory function tests, a significant increase was determined in the FEV1 values following acupuncture, but the long term effects were not known as there was no follow-up. While Cioppa reported an improvement in 67% of patients with acupuncture treatment, Blanc *et al.* stated the response to acupuncture at 5% in patients with asthma.[7,26] In the current study, recovery was determined at the rate of 25.7% in patients with mild asthma and at 20% in those with moderate asthma.

There are studies which have reported a reduction in doses of medications used with acupuncture treatment. Biernacki *et al.* reported that acupuncture as an adjuvant treatment was beneficial in reducing bronchodilator dosages in patients with mild or moderate asthma, especially in those with anxiety and increased the quality of life.[9] It was determined by Zhang *et al.* that acupuncture achieved a real long-term therapeutic effect by reducing the dosage of asthma medication and improving clinical and pulmonary symptoms.[18]

However, there are conflicting research results related to the efficacy of acupuncture in asthma.[27-29] Kleijnen *et al.* supported the view that acupuncture is not useful in the short or long term, Shapira *et al.* in moderately persistent asthma and Medici *et al.* in patients under treatment for mild and moderate bronchial asthma.[27,30,31] Tashkin *et al.* also stated that no evident benefit was seen from the application of short or long-term acupuncture in the treatment of moderate or advanced asthma.[32] The results of acupuncture studies may be false due to certain methodological errors such as incorrect definition of the severity of asthma, inadequate blinding methods, not having suitable control groups and insufficient patient numbers, all of which prevent correct interpretation of studies related to this subject in English literature.[16] In a meta-analysis of controlled studies related to the subject by Kleijnen *et al.* and Martin *et al.* it was reported that respiratory function tests after acupuncture were inadequate.[27,28] Researchers have reported error rates as high as 50-90% related to study methodology which could mask the positive aspects of acupuncture treatment.[20,31] Therefore there are not enough clinical studies of acupuncture treatment in asthma.[5, 27]

According to the results of the current study, it can be said that acupuncture is effective in improving respiratory functions in newly-diagnosed patients with mild and moderate asthma who have not yet taken any medication. Despite these significant results, the main limitation of this study is that no data was obtained of the efficacy of acupuncture in the long term. Although acupuncture is effective in asthma treatment according to the current study results, there is a need for further, more extensively measured, placebo-controlled, randomized studies. Thereby, the amount of medication used in asthma treatment could be significantly reduced.

*The authors declare that there are no conflicts of interest.

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DELIVERING DATE: 29 / 07 / 2015 • **ACCEPTED DATE:** 21 / 10 / 2015

REFERENCES

1. Global Strategy for Asthma Management and Prevention 2012, Global Initiative for Asthma (GINA). http://www.ginaasthma.org.
2. Bateman ED, Bousqet J, Keech ML, et al. The correlation between asthma control and health status: the GOAL study. Eur Respir J 2007; 29; 56-62.
3. Suissa S, Ernst P, Benayoun S, Baltzan M, Cai B. Low dose inhaled corticosteroids and the prevention of death from asthma. N Engl J Med 2000; 343: 332-336.
4. Davis PA, Chang C, Hackman RM, Stern JS, Gershwin ME. Acupuncture in the treatment of asthma. A critical review. Allergol Immunopathol 1998: 26; 263-271.
5. Chu KA, Wu YC, Lin MH, Wang HC. Acupuncture resulting in immediate bronchodilating response in asthma patients. J Chin Med Assoc 2005; 68: 591-594.
6. Ernst E. Acupuncture-how effective is it really? Fortschiritte-der-Medizin 1998; 116: 20-26.
7. Blanc PD, Trupin L, Earnest G, et al. Alternative therapies among adults with a reported diagnosis of asthma or rhinosinusitis. Chest 2001; 120: 1461-1467.
8. Aldridge D, Pietroni PC. Clinical assesment of acupuncture in asthma theraphy: discussion paper. J Roy Soc Med 1987; 80: 222-224.
9. Biernacki W, Peake MD. Acupuncture in treatment of stable asthma. Respiratory Medicine 1998; 9: 1143-1145.
10. Kartal Ö, Çalışkaner AZ, Şener O. Acupuncture treatment in asthma and allergic diseases. TAF Prev Med Bull 2011; 10: 107-114.
11. World Health Organization Regional Office for the Western Pacific. WHO standard acupuncture point locations in the Western Pacific region. Manila, Philippines: World Health Organization; 2008.
12. Knipschild P, Kleijnen J, ter Riet G. Belief in the efficacy of alternative medicine among general practitioners in The Netherlands. Soc Sci Med 1990; 31: 625-626.
13. Zwolfer W, Keznickl-Hillebrand W, Spacek A, et al. Beneficial effect of acupuncture on adult patients with asthma bronchiale. Am J Chin Med 1993; 21: 113-117.
14. Fuller JA. Letter: Acupuncture. Med J Aust 1974; 2: 340-341.
15. Anonymous. NIH consensus conference. Acupuncture. JAMA 1998; 280: 1518-1524.
16. Orhan F, Şekerel BE. Bronşial astım tedavisinde alternatif yöntemler. T Klinik J Allergy Asthma 2002; 4: 129-134.
17. Joos S, Schoot C, Zou H, Daniel V, Martin E. Immunmodulatory effects of acupuncture in the treatment of allergic asthma; a randomized controlled study. J Altern Complement Med 2000; 6: 519-525.
18. Zhang WP. Effects of acupuncture on the pulmonary function and heart rate variability in different state of bronchial asthma. Zhen Ci Yan Jiu 2007; 32: 42-48.
19. Collison DR. Which astmatic patients should be treated by hypnotheraphy. Med J Australia 1975; 1: 776-781.
20. Dias PLR, Subramaniam S, Lionel NDW. Effects of acupuncture in bronchial asthma preliminary communication. J Roy Soc Med 1982;75:245-8.
21. Chu KA, Wu YC, Ting YM, Wang HC, Lu JY. Acupuncture therapy results in immediate bronchodilating effect in asthma patients. J Chin Med Assoc 2007; 70: 265-268.
22. Yu DY, Lee SP. Effect of acupuncture on bronchial asthma. Clin Sci Mol Med 1976; 51: 503-509.
23. Takishima T, Mue S, Tamura G, Ishihara T, Watanabe K. The brochodilating effect of acupuncture in patients with acute asthma. Ann Allergy 1982; 48: 44-49.
24. Scheewe S, Vogt L, Minakawa S, et al. Acupuncture in children and adolescents with bronchial asthma: a randomised controlled study. Complement Ther Med. 2011; 19: 239-246.
25. Karlson G, Bennicke P. Acupuncture in asthmatic children: a prospective, randomized, controlled clinical trial of efficacy. Altern Ther Health Med 2013; 19: 13-19.

26. Cioppa FJ. Clinical evaluation of acupuncture in 129 patients. Dis Nerv Syst 1976; 37: 639-643.
27. Kleijnen J, Riet G, Knipschild P. Acupuncture and asthma: a review of controlled trials. Thorax 1991; 46: 799-802.
28. Martin J, Donaldson AN, Villarroel R, et al. Efficacy of acupuncture in asthma: systemic review and metaanalysis of published data from 11 randomised controlled trials. Eur Respir J 2002; 20: 846-852.
29. Tandon MK, Soh PFT. Comparison of real and plasebo acupuncture in histamine-induced asthma; a double-blind crossover study. Chest 1989; 96: 102-105.
30. Shapira MY, Berkman N, Ben- David G, et al. Short-term Acupuncture therapy is of no benefit in patients with moderate persistent ashma. Chest 2002; 121: 1396-1400.
31. Medici TC, Grebski E, Wu J, Hınz G, Wütrich B. Acupuncture and bronchial asthma: A long-term randomized study of the effects of real versus sham acupuncture compared to controls in patients with bronchial asthma. J Altern Complement Med 2002; 8: 737-750.
32. Tashkin DP, Kroening RJ, Bresler DE, et al. A controlled trial or real and simulated acupuncture in the management of chronic asthma. J Allergy Clin Immunol 1985; 76: 855-864.