Acupoint herbal patching for allergic rhinitis: a systematic review and meta-analysis of randomised controlled trials

Zhou, F.,*† Yan, L.-J.,‡ Yang, G.-Y.* & Liu, J.-P.*

*Center for Evidence-Based Chinese Medicine, Beijing University of Chinese Medicine, Beijing, China †School of Nursing, Beijing University of Chinese Medicine, Beijing, China ‡Department of Neurology, Guangdong Province Traditional Chinese Medicine Hospital, Guangzhou, China

Accepted for publication 3 March 2015
Clin. Otolaryngol. 2015, **40**, 551–568

Background: Acupoint herbal patching (AHP) is extensively used in treatment of allergic rhinitis in China. However, existing systematic review is insufficient.
Objective of review: To evaluate the effectiveness and safety of AHP in treating allergic rhinitis.
Search strategy: We searched seven electronic databases for randomised controlled trials (RCTs) from inception until August 2014.
Evaluation method: Two authors selected studies, extracted data and evaluated risk of bias independently. The Cochrane risk of bias tool was applied to assess the methodological quality of the included trials, and RevMan 5.2 software was utilised to perform data analysis.
Results: Twenty RCTs involving 2438 participants were included. Most of them were evaluated as high risk of bias. Acupoint herbal patching significantly decreased the recurrence rate at 6 months compared with Western medicine (RR 0.52; 95% CI 0.42–0.64), and similar effect was found for AHP plus Western medicine *versus* Western medicine (RR 0.53; 95% CI 0.44–0.65). Acupoint herbal patching appeared to be more effective than placebo in improving total clinical symptoms and signs after treatment and at 6 months, and in improving quality of life at <3 months and over 3 months. No severe adverse effects were found in the AHP groups.
Conclusions: Acupoint herbal patching alone or combined with Western medicine appears to be more effective than placebo or Western medicine, respectively. Acupoint herbal patching seems to be a safe treatment. However, the findings should be interpreted with caution. Further large-scale, rigorously designed trials are warranted to confirm the findings.

Allergic rhinitis (AR) is a symptomatic disorder of the nose induced after allergen exposure, which is characterised by nasal congestion and discharge, sneezing and nasal itching.[1] It is subdivided into intermittent and persistent AR, and the prevalence ranges from 1% to 40% and 1% to 13% worldwide, respectively.[2] In China, the prevalence of AR varies from 8.7% to 37.9% and has increased in both adults and children over the last two decades.[3]

AR is associated with significantly impaired quality of life, sleep, hearing and reduces productivity.[4–8] It is estimated that about 200 million AR may represent an early stage of asthma.[9] According to the Agency for Health Care Research and Quality and the National Center for Health Statistics of United State, the direct cost of AR was 6.1 billion dollars in 2000 and almost doubled in 2005, and the indirect cost was inestimable.[10]

Correspondence: J.-P. Liu, Center for Evidence-Based Chinese Medicine, Beijing University of Chinese Medicine, 11 Bei San Huan Dong Lu, Chaoyang District, Beijing 100029, China. Tel.: +86 10 64286760; fax: +86 10 64286871; e-mail: jianping_l@hotmail.com

Current conventional symptomatic treatment of AR includes intranasal corticosteroids, antihistamines, decongestants, cromolyn, and leukotriene receptor antagonists and most of them have adverse effects.[11] If medications appear to be inadequate, immunotherapy can be alternative choice.[12] However, this therapy is inconvenient, with a few standardised allergens and risk of systemic anaphylactic reactions.[13]

Acupoint herbal patching (AHP), also known as *xueweitiefu*, is defined as an external application of the processed medicinal herbal preparations directly to specific portions of the body to produce therapeutic effects through skin absorption and/or stimulating the meridians and acupoints.[14] Here, acupoints are the specific sites through which the *qi* of *zang-fu* organs and meridians (pathways in which the *qi* and blood of the human body are circulated) is transported to the body surface. Herbal patches are applied on acupoints to regulate the functional activities of body, strengthen body resistance so as to prevent and treat disease.[15] AHP is firstly recorded in the Formulae for Fifty-two Disease (*Wu Shi Er Bing Fang*, the oldest prescription of traditional Chinese

Medicine, written around the fourth century BC.).[16] AHP used in AR treating was formulated in *Zhang Shi Yi Tong* (*Qing* Dynasty, 1644–1912).[17] Nowadays, according to the seasons, AHP can be classified into *sanfu* AHP (only applied during *sanfu* period) and non-*sanfu* AHP (applied without a specific time frame). In the Chinese Lunar Calendar, *sanfu* refers to the hottest period of the year between mid-July and mid-August. This period of time is of special significance in traditional Chinese medicine (TCM) in treating AR when *yang* in human body is the strongest.

Use of AHP is very popular in China, and 653 medical institutions applied *sanfu* AHP in Beijing according to the year 2014s official data.[18] The Beijing Daily reported 19 000 people in 2009 and 27 000 people in 2010 used *sanfu* AHP in only one TCM general hospital.[19]

Many pre-clinical and clinical studies showed the promising effect of AHP in treating AR.[20–26] In 2013, a systematic review included eight randomised controlled trials (RCTs) published in Chinese focused on AHP for AR, which showed a potential benefit.[27] However, it only has involved the outcome of effectiveness rate and did not evaluate the safety of AHP. The objective of this review is to evaluate the effectiveness and safety of AHP for AR, using recurrence rate, specific symptoms and quality of life as primary outcomes.

Methods

Protocol and registration

This systematic review was registered in an international prospective register of systematic reviews, with the registration number CRD42013006358 (available from http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42013006358).

Eligibility criteria. Randomised controlled trials testing the effect of AHP for AR with no limitations on language, publication type or blinding were eligible.

Participants. Patients with any types of AR regardless of gender, age, ethnic group, severity, diagnosed with international criteria or TCM diagnosis criteria. Trials including participants complicated with asthma or sinusitis were excluded.

Intervention. Acupoint herbal patching was defined as pasting herbal plaster on some acupoints of patient's body regardless of herb regimen, acupoints selected, patching season or treatment sessions.

Control. Placebo, no treatment, Western medicine (referred by AR and its impact on asthma workshop report)[1] and immunotherapy were considered eligible. Combination of AHP and Western medicine or immunotherapy compared with same Western medicine or immunotherapy was also included.

Outcomes. Primary outcome measures were recurrence rate of AR, improvement of clinical symptoms and signs including sneezing, rhinorrhea, stuffiness, itchy nose evaluated by scoring criteria, and quality of life measured by a validated instrument or tool such as Rhinoconjunctivitis Quality of Life (RQLQ) and 36-item Short Form Health Survey (SF-36). Secondary outcome measures included biomarkers and adverse effects.

Study identification and selection

We searched RCTs which could be published, unpublished and ongoing. All the following electronic databases were searched from their inception to August 2014: PubMed, EMBASE, Cochrane Central Register of Controlled Trials in the Cochrane Library, China National Knowledge Infrastructure, Chinese Science and Technology Periodical Database, Chinese Biomedical Literature Database and Wanfang Database. And reference lists of all full text papers were hand-searched in case of additional relevant trials. The ongoing trials were searched from mainstream registries. Details of the mainstream registries and search strategies for each database could be found in the Supporting Information.

Zhou F and Yan LJ identified studies for eligibility and checked against inclusion criteria independently. Through screening titles and abstracts, we removed obviously irrelevant trials, then downloaded full texts if they met the eligibility criteria.

Data extraction

Zhou F and Yan LJ independently extracted data on patient characteristics, details of the intervention and control, outcome measures and results. We resolved different opinions by discussion or consultation with Liu JP.

Methodological assessment

Zhou F and Yan LJ assessed the methodological quality of the included studies independently using the risk of bias tools according to the Cochrane Handbook version 5.1.0.[28] Any disagreements happened, a third author (Liu JP) was involved. Six bias items were as follows: selection bias, performance bias, detection bias, attrition bias, reporting bias and others, and each was categorised as low, high and unclear risk.[28]

Statistical analysis

We performed statistical analysis using RevMan 5.2. (The Nordic Cochrane Centre, The Cochrane Collaboration, Copenhagen, Denmark) Dichotomous data were expressed as risk ratio (RR) with 95% confidence interval (95% CI); while the continuous data were presented as mean difference (MD) with 95% CI. If different measurement scales were used, standardised mean difference (SMD) was performed. Heterogeneity was assessed using the I^2 statistic. I^2 value ≥50% was considered as indicative of substantial heterogeneity,[28] and a random-effect model was applied. Funnel plots were generated to detect publication bias if more than 10 trials were identified to report the same outcomes.

For outcomes observed at the multiple time points, data were analysed as subgroups, that is improvement of symptoms and signs, within 3 months and over 3 months.

Results

Trial selection

The flow chart of search process and study selection is shown in Fig. 1.

Trial characteristics

Twenty included trials were conducted in China,[29–48] of which 19 published in Chinese, only one conducted in Taiwan and published in English.[29] In total, 2438 participants with AR were involved in the 20 trials, aged between 5 and 65 and the duration of disease varied from 0.5 to 28 years. Five trials involved participants younger than 18 years,[31,32,35,36,48] and one trial involved only children.[35] Detailed characteristics of the trials are listed in Table 1.

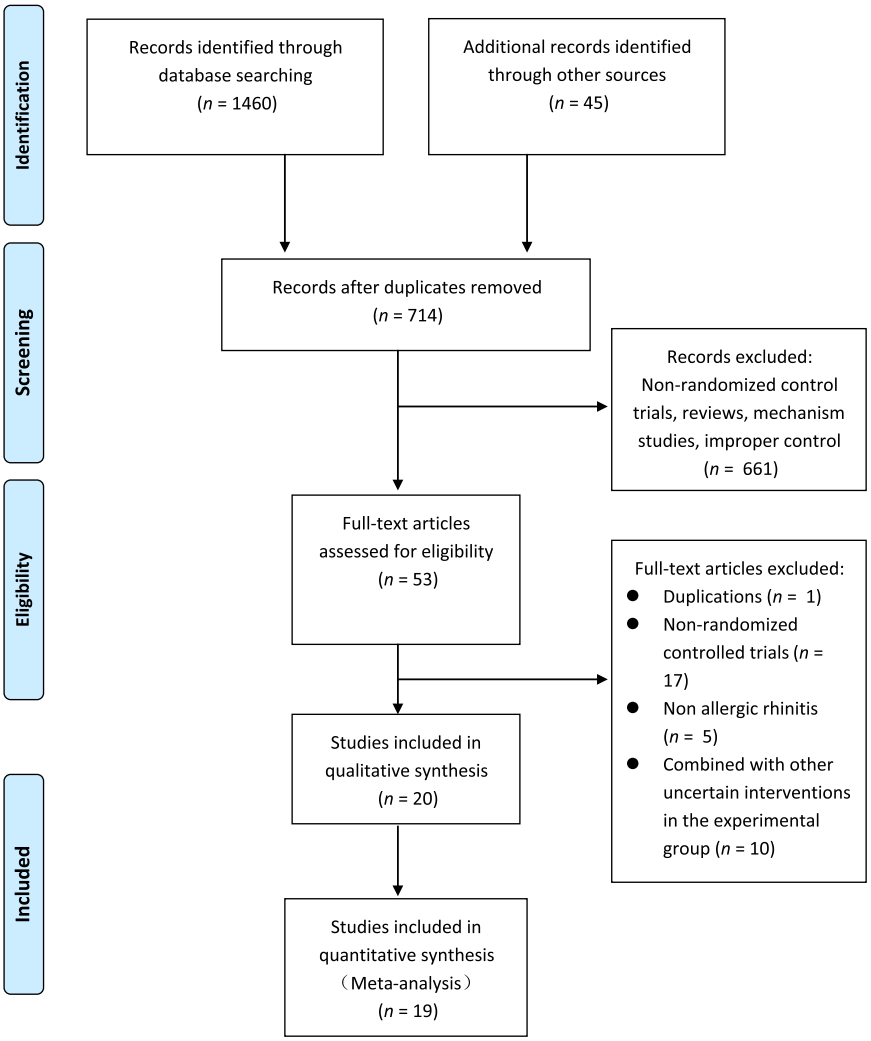

Fig. 1. Flow diagram of study searches and selection.

Table 1. Characteristics of included trials

Study ID [Ref.]	Sample (R/A)	Age (year) Range or Mean ± SD	Diagnostic criteria	Classification of AR: no. subjects	Severity of AR: no. subjects	History (year) Range or Mean ± SD (Years)	CM syndrome differentiation
Hsu 2010[29]	T:18/18 C:15/15	Total: 22.6 ± 6.3	Symptoms for over 2 years, specific allergen identified with elevated T-IgE, elevated ECP*	NR	NR	NR	NR
Hu 2010[30]	T:60/60 C:60/60	T:8–60 C:9–64	WDC: Chinese Journal of Otorhinolaryngology-1997[49]	NR	NR	T: 0.5–19 C:1–17	NR
Hu 2012[31]	T:30/27 C:30/21	T:26 ± 7 C:23 ± 2	WDC: Chinese Journal of Otorhinolaryngology-1997[49]	NR	NR	NR	NR
Kong 2010[32]	T:82/82 C:75/75	T:8–69 C:9–64	WDC: Chinese Journal of Otorhinolaryngology-1997[49]	NR	NR	T: 0.5–19 C:1–17	NR
Liao 2008[33]	T:38/38 C:38/38	T:30.52 ± 9.53 C:31.23 ± 10.56	WDC: Chinese Journal of Otorhinolaryngology-1997[49] CDC: Medicine Science and Technology Press of China[52]	NR	T:Mild 16, Moderate17, Severe 5. C:Mild 18, Moderate 13, Severe 7.	T:7.13 ± 1.52 C:6.92 ± 1.64	T: Lung *qi* deficiency and pathogenic wind attacking the superficies type (18) Lung and spleen *qi* deficiency type (10) Insufficiency of the kidney *yang* type (10) C: Lung *qi* deficiency and pathogenic wind attacking the superficies type (14) Lung and spleen *qi* deficiency type (16) Insufficiency of the kidney *yang* type (8)
Lin 2013[34]	T:30/30 C:30/30	T:37.27 ± 11.40 C:37.20 ± 10.81	WDC: Chinese Journal of Otorhinolaryngology-2004[50] CDC: State Administration of Traditional Chinese Medicine-1995[51]	NR	NR	T:4.24 ± 2.64 C:4.26 ± 2.87	NR

Table 1. continued

Study ID [Ref.]	Sample (R/A)	Age (year) Range or Mean ± SD	Diagnostic standard	Classification of AR: no. subjects	Severity of AR: no. subjects	History (year) Range or Mean ± SD (Years)	CM Syndrome Differentiation
Liu 2011[35]	T:152/152 C:150/150	T:8.25 ± 4.32 C:8.16 ± 4.43	WDC: Chinese Journal of Otorhinolaryngology Head and Neck Surgery-2004[50] CDC: State Administration of Traditional Chinese Medicine-1995[51]	NR	Clinical symptom scores[50] T:10.05 ± 1.27 C:10.08 ± 1.09	T:0.5–14 C:0.5–13.5	NR
Ma 2012[36]	T:60/60 C:60/60	T:8–65 C:6–62	CDC: State Administration of Traditional Chinese Medicine-1995[51]	Perennial/ seasonal AR: 45/75 in total	NR	T:0.5–15 C:1–17	NR
Mi 2010[37]	T:158/158 C:158/158	T:36 ± 12 C:36 ± 13	WDC: Chinese Journal of Otorhinolaryngology-1997[49] CDC: State Administration of Traditional Chinese Medicine-1995[51]	NR	NR	T:4.7 ± 2.2 C:4.2 ± 2.8	T:Lung deficiency-related cold type (48), Deficiency weakness of spleen *qi* type (59), The kidney *yang* deficiency type (51) C:NR
Mi 2011[38]	T:49/49 C:44/44	T:37.14 ± 13.627 C:NR	WDC: Chinese Journal of Otorhinolaryngology-1997[49]	NR	Clinical symptom scores[49] T:11.53 ± 2.451 C: 11.73 ± 2.518	Total: 0.5–15	NR
Shi 2011[39]	T:30/30 C:30/30	T:20–56 C:19–58	WDC: Chinese Journal of Otorhinolaryngology Head and Neck Surgery-1997[49]	NR	NR	T:2–6 C:2–6	NR
Song 2013[40]	T:35/35 C:35/35	T:42.15 ± 10.31 C:43.68 ± 11.67	WDC: Chinese Journal of Otorhinolaryngology Head and Neck Surgery-2004[50] CDC: State Administration of Traditional Chinese Medicine-1995[51]	Perennial/ seasonal AR T: 9/26 C: 11/23	NR	T: 9.02 ± 2.61 C:8.34 ± 2.98	Lung deficiency-related cold type

Table 1. continued

Study ID [Ref.]	Sample (R/A)	Age (year) Range or Mean ± SD	Diagnostic standard	Classification of AR: no. subjects	Severity of AR: no. subjects	History (year) Range or Mean ± SD (Years)	CM Syndrome Differentiation
Sun 2007[41]	T:155/155 C:153/153	T:34 ± 13.5 C:32 ± 14	WDC: Chinese Journal of Otorhinolaryngology Head and Neck Surgery-2004[50]	NR	NR	T: 0.5 ± 20 C:0.5 ± 25	NR
Wang 2013[42]	T:30/28 C:30/26	T:28.36 ± 13.35 C:33.19 ± 16.71	WDC: Chinese Journal of Otorhinolaryngology-1997[49]	NR	NR	T:7.43 ± 6.53 C:6.04 ± 3.50	NR
Wen 2007[43]	T:118/118 C:118/118	T:18–56 C:18–54 (range)	WDC: Chinese Journal of Otorhinolaryngology-1997[49]	All belonged to perennial AR	NR	T:2–25 C:2–28	NR
Wu 2013[44]	T:42/42 C:42/42	NR	WDC: Chinese Journal of Otorhinolaryngology Head and Neck Surgery-1997[49]	NR	NR	NR	NR
Xu 2012[45]	T:45/45 C:45/45	T:18–49 C:16–51 (range)	WDC: Chinese Journal of Otorhinolaryngology Head and Neck Surgery-2004[50]	NR	NR	T:1–21 C:1–22	NR
Zhang 2012[46]	T:30/30 C:30/30	T:10.25 ± 2.56 C:11.12 ± 2.12	WDC: Chinese Journal of Otorhinolaryngology-1997[49] CDC: State Administration of Traditional Chinese Medicine-1995[51]	NR	NR	NR	Total: Lung deficiency-related cold type
Zhang 2007[47]	T:30/30 C:30/30	NR	CDC: State Administration of Traditional Chinese Medicine-1995[51]	NR	NR	NR	NR
Zhu 2010[48]	T:47/47 C:44/44	T:5–55 C:8–50 (range)	CDC: State Administration of Traditional Chinese Medicine-1995[51]	NR	NR	T:0.5–21 C:0.6–20	NR

R, number of subjects randomised; *A*, number of subjects analysed; CM, Chinese medicine; WDC, Western medicine diagnostic criteria; CDC, Chinese medicine diagnostic criteria; SD, standard deviation; T, treatment group; C, control group; NR, not reported.

*Although this trial did not offer the name of diagnostic criteria, it followed the Western medicine diagnostic criteria.

Seventeen Chinese herbs and 23 acupoints were applied for the AHP intervention. Although some of the ingredients of AHP were different among the included trials, the main properties and flavour of the herbs were similar: acrid-warm and penetrating; and majority of the formulae of the herbal patches had same purpose to warm *yang* for dispelling cold, and benefit *qi* for promoting spleen *yang*. Thus, they were considered as the same orientation. All the main constituents of herb ingredients and locations of selected acupuncture points are listed in the Table S1.

Eighteen trials reported the participants with total improvement of clinical symptoms and signs (i.e. *cure, markedly effective, effective*).[49–52] Four trials reported scores of several single symptoms and signs (the lower the score, the milder the symptom).[49,50] Only four trials reported information about adverse events.[29,35,39,40,46] The characteristics of AHP therapy and outcome measures are listed in Table 2.

Methodological quality

According to the pre-defined quality assessment criteria, the included trials were evaluated as high risk of bias (Fig. 2).

Seven trials (35%) used a random number table,[31,33,35,42,45–47] while one applied drawing lots,[40] one conducted computer randomisation,[29] and 11 trials did not report any details about randomisation. No trial mentioned the allocation concealment. Three trials applied the single blinding to patients,[29,37,47] while two trials used the blinding to patients, evaluators and statistician.[31,42] Only two trials reported the number of dropouts.[31,42] No trial provided trial registration information. Six trials published as postgraduate theses were appraised as low risk of bias.[29,33,35,39,42,47] No trial performed estimation of sample size. Comparable baseline characteristics were described in 19 trials.

Effects of interventions

The overall effect estimates of AHP are shown in the Table 3.

Recurrence rate of AR during follow-up. Of two trials reported this outcome,[35,41] compared with Western medicine, AHP significantly decreased the recurrence rate at sixth months (RR 0.52; 95% CI 0.42–0.64).[35] Similar finding was also found in AHP plus Western medicine compared with the same Western medicine (RR 0.53; 95% CI 0.44–0.65).[41]

Total improvement rate of clinical symptoms and signs. AHP *versus* placebo: Meta-analysis of two trials showed that AHP was better than placebo at ≤3 months (RR 4.61; 95% CI 2.61–8.14).[42,47] Mi's trial reported AHP has a better effect than placebo at third month (RR 4.85; 95% CI 3.42–6.89) and sixth month (RR 6.33; 95% CI 4.23–9.49).[37]

AHP *versus* Western medicine: Seven trials were available for a meta-analysis,[30,35,38,39,43,45,46] which demonstrated no significant difference at ≤3 months (RR 1.04; 95% CI 0.92–1.17). However, meta-analysis of five trials showed AHP was superior to Western medicine at > 3 months (RR 1.35; 95% CI 1.22–1.49).[32,34,43,45,48] Wen's trial reported a better effect of AHP than Western medicine at 12 month (RR 1.50; 95% CI 1.18–1.91).[43]

AHP plus Western medicine *versus* Western medicine: A meta-analysis of four trials demonstrated that AHP plus Western medicine improved symptom and signs at ≤3 months (RR 1.22; 95% CI 1.12–1.33).[33,40–44] However, another meta-analysis of two trials showed no significant difference at >3 months (RR 1.62; 95% CI 0.96–2.73).[33,36]

Improvement of individual symptoms and signs. AHP *versus* placebo: A meta-analysis of two trials showed AHP had lower scores in sneezing (SMD −0.52; 95% CI −0.97 to −0.11), rhinorrhea (MD −0.44; 95% CI −0.81 to −0.07) and stuffiness (MD −0.54; 95% CI −0.82 to −0.25), but not in itchy nose at ≤3 months (MD −0.46; 95% CI −1.00 to −0.08).[29,42] In addition, Wang's trial demonstrated that AHP decreased the scores in sneezing at sixth month (MD −0.41; 95% CI −0.77 to −0.05).[42]

AHP *versus* Western medicine: Shi's trial reported reduced score of sneezing of AHP (MD −0.73; 95% CI −1.13 to −0.33), but not for the other three symptoms at ≤3 months.[39]

AHP plus Western medicine *versus* Western medicine: Song's trial showed that the combination therapy was better in decreasing the scores of four common clinical symptoms at ≤3 months (sneezing: MD −0.32; 95% CI −0.54 to −0.10; rhinorrhea: MD −0.37; 95% CI −0.57 to −0.17; stuffiness: MD −0.37; 95% CI −0.64 to −0.10; itchy nose: MD −1.04; 95% CI −7.14 to −5.06).[40]

Quality of life. Two trials reported quality of life using higher scores reflecting lower quality of life (RQLQ).[31,42] Two meta-analyses demonstrated that AHP improved the quality of life compared with placebo at ≤3 months (MD −8.92; 95% CI −13.39 to −4.45) or at >3 months (MD −9.03; 95% CI −13.58 to −4.49). Furthermore, Hsu's trial reported no significant difference between AHP and placebo on SF-36.[29]

Biomarkers. Three trials reported serum IgE at ≤3 months.[29,35,46] Liu's trial reported decreased level of serum IgE by AHP compared with Western medicine.[35] Zhang's trial did not show any difference between AHP and sublingual-specific immunotherapy[46]; and Hsu's trial found

Table 2. Characteristics of AHP therapy and outcome measures of included trials

Study ID [Ref.]	Comparison type	Acupoints selected	Herbal components	Excipient	Pasting time	Frequency and duration of AHP	Control interventions	Outcome observation time	Outcome measures
Hsu 2010[29]	Non-*sanfu*, AHP *versus* Placebo	DU14, BL12, BL13, EX-B1	Semen Sinapis, Radix Kansui, Rhizoma Corydalis	Succus Rhizomatis Zingiberis	Non-*sanfu*	Once weekly, keep patching 3 h, 3 times	Flour, water and edible pigments	1 week after treatment finished	Clinical symptom, QoL-SF-36, T-IgE, ECP
Hu 2012[31]	Non-*sanfu*, AHP *versus* Placebo	DU14, BL12, BL13, BL23, BL43, BL52	Semen Sinapis, Herba Asari, Radix Kansui, Rhizoma Corydalis	Succus Rhizomatis Zingiberis	Non-*sanfu*	Once per 10 days, keep patching 2–6 h, 5 times	Starch with ginger juice	6 months after treatment finished	Qol-RQLQ
Lin 2013[34]	Non-*sanfu*, AHP *versus* WM	BL13, BL43, BL23, DU14, BL12, BL20, RN17	Semen Sinapis, Herba Asari, Radix Kansui, Rhizoma Corydalis, Flos Caryophylli, Radix Angelicae Dahuricae	Ginger juice	Non-*sanfu*	Once per 10 days, keep patching 2 h, 9 times	Loratadine, 5 mg, qd, 30 days	3 months after treatment finished	Clinical symptom score-2004, ER-2004[50]
Mi 2011[38]	Non-*sanfu*, AHP *versus* WM	BL13, BL21, BL20, BL12, BL43, BL23, EX-B1, BL15	Semen Sinapis, Herba Asari, Radix Kansui, Rhizoma Corydalis	Ginger juice	Non-*sanfu*	Once every 10 days, keep patching 1–2 h, 9 times	Budesonide nasal spray (Rhinocort), each nostril 1 spray, bid, 60 days	3 months after treatment finished	Clinical symptom score-1997, ER-1997[49]
Wen 2007[43]	Non-*sanfu*, AHP *versus* WM	DU14, BL13, BL20, BL23	Semen Sinapis, Herba Asari, Radix Kansui	Ginger juice	Non-*sanfu*	Once per 5–7 days, keep patching 4–6 h, 6 times	BCG-Polysaccharide nucleic acid (BCG-PSN), 1 mL, qd, im, 10 days	1 month, 6 month, 12 month after treatment finished	Clinical symptom score-1997, ER-1997[49]
Ma 2012[36]	Non-*sanfu*, AHP+WM *versus* WM	DU14, BL13, BL12, BL20, BL23, LI20	Semen Sinapis, Radix et Rhizoma Asari, Radix Kansui, Rhizoma Corydalis, Herba Ephedrae, Cortex Cinnamomi, Moschus	NR	Non-*sanfu*	Bid, keep patching 2–6 h, 15 times	Loratadine, 10 mg, qd, 10 days	3 months after treatment finished	ER-1995[51]

Table 2. continued

Study ID [Ref.]	Comparison type	Acupoints selected	Herbal components	Excipient	Pasting time	Frequency and duration of AHP	Control interventions	Outcome observation time	Outcome measures
Shi 2011[39]	Non-*sanfu*, AHP+WM *versus* WM	DU14, BL13, BL17, ST36	Grinding the Chinese herb (with properties of warm channel to expel cold, tonify deficiency to support *yang*) first, then turning into paste in proportion	NR	Non-*sanfu*	Once per *2–3 days*, 15 days	Cetirizine, 10 mg, qd	After treatment finished	Clinical symptom score-1997, ER-1997,[49] Adverse event
Song 2013[40]	Non-*sanfu*, AHP+WM *versus* WM	DU14, BL13, BL12	*Daiwenjiu* provided by a pharmaceutical company (Lot number: 1003021)	NR	Non-*sanfu*	Once per day, keep patching 2–6 h, 14 times	Cetirizine, 10 mg, qd, 14 days	After treatment finished	Clinical symptom score-2004, ER-2004,[50] Adverse event
Mi 2010[37]	*Sanfu*, AHP *versus* Placebo	BL13, BL21, BL52, BL20, BL12, BL43, BL23, EX-B1, BL15	Semen Sinapis, Herba Asari, Radix Kansui, Rhizoma Corydalis	Succus Rhizomatis Zingiberis	*Sanfu*, once in first *fu*, then once every 10 days, and Strengthen 2 months	Once per fu, keep patching 1–2 h, 1			
			sanfu + 2 months	Cattail Pollen, edible pigments with ginger juice	6 months after treatment finished	Clinical symptom score-1997, ER-1997[49]			
Wang 2013[42]	*Sanfu*, AHP *versus* Placebo	BL13, BL20, BL23, DU14, BL12, BL43, BL52	Semen Sinapis, Herba Asari, Radix Kansui, Rhizoma Corydalis	Succus Rhizomatis Zingiberis	*Sanfu*, once 10 days (enhance once on first *fu* and last *fu*)	Once per *fu*, keep patching 4–6 h, 5 times	Buckwheat grind powder, with fresh ginger juice	6 months after treatment finished	Clinical symptom score-1997, ER-97,[49] Qol-RQLQ

Table 2. continued

Study ID [Ref.]	Comparison type	Acupoints selected	Herbal components	Excipient	Pasting time	Frequency and duration of AHP	Control interventions	Outcome observation time	Outcome measures
Zhang 2007[47]	*Sanfu*, AHP *versus* Placebo	DU14, BL12, BL13, BL23, DU4	Semen Sinapis, Herba Asari, Ramulus Cinnamomi, Radix Aconiti Lateralis Praeparata, Fructus Perillae	Succus Rhizomatis Zingiberis	*Sanfu*, first day of each *fu*	Once per *fu*, keep patching 1–1.5 h	100% flour with boiled water	After treatment finished	Clinical symptom score-1997, ER-1997[49]
Kong 2010[32]	*Sanfu*, AHP *versus* WM	BL12, BL13, BL43, BL20, BL23, DU9	Semen Sinapis, Herba Asari, Radix Kansui, Rhizoma Corydalis, Moschus	Ginger juice	*Sanfu*, first day of each *fu*	Once per *fu*, keep patching 4–6 h	Cetirizine, 10 mg, qd, 15 days	3 months after treatment finished	ER-1997[49]
Hu 2010[30]	*Sanfu*, AHP *versus* WM	BL43, DU14, BL12, BL13, EX-HN15, BL20, BL17, BL23	Semen Sinapis, Herba Asari, Radix Kansui, Rhizoma Corydalis, Radix Scutellariae	Succus Rhizomatis Zingiberis	*Sanfu*, first day of each *fu*	Once per 10 days, keep patching 2–6 h, 3 times	CetirizineAQ (Zyrtec), 10 mg, qd. Beclomethasone dipropionate aqueous nasal spray (beconase), 2 sprays daily, tid, 10 days	After treatment finished	Clinical symptom score-1997[49]
Liu 2011[35]	*Sanfu*, AHP *versus* WM	BL13, LU7, DU14, BL10, BL20	Herba Asari, Herba Centipedae, Mylabris, Herba Agastachis qd + budesonide nasal spray (Rhinocort), bid, 14–28 days	NR 3 months (only for recurrence rate) after treatment finished	*Sanfu*, first day of each *fu* Recurrence rate, Clinical symptom score-2004, ER-2004,[50] IgE Adverse event	Keep patching 3–4 h, 3 *fu*s	Antihistamine (Clarityne), 10 mg,		
Xu 2012[45]	*Sanfu*, AHP *versus* WM	DU14, BL43, BL13, BL20, BL23	Semen Sinapis, Herba Asari, Radix Kansui, Rhizoma Corydalis	Ginger juice	*Sanfu*, first day of each *fu*	Once per *fu*, once every 10 days, keep patching 8 h, 3 *fu*s	Antihistamine (Clarityne), 10 mg,		

Table 2. continued

Study ID [Ref.]	Comparison type	Acupoints selected	Herbal components	Excipient	Pasting time	Frequency and duration of AHP	Control interventions	Outcome observation time	Outcome measures
			qn + Budesonide nasal spray (Rhinocort), bid, 7 days	1 month and 12 months after treatment finished	Clinical symptom score-2004 ER-2004[50]				
Zhu 2010[48]	*Sanfu*, AHP *versus* WM	DU14, RN17, BL12, BL13, BL20, BL23	Semen Sinapis, Herba Asari, Radix Kansui, Rhizoma Corydalis, Rhizoma Pinelliae	Dimethyl sulfoxide	*Sanfu*, first day of each *fu*	Once per *fu*, once every 10 days, keep patching 4–6 h, 3 *fu*s	Cetirizine, 10 mg,		

qd + beclomethasone dipropionate aqueous nasal spray (beconase), 2 sprays once, tid, 10 days3 months after treatment finishedER-1995[51] Liao 2008[33]*Sanfu,* AHP+WM *versus* WMDU14, BL13, BL23, PC6Semen Sinapis, Herba Asari, Radix Kansui, Radix Angelicae Dahuricae, Radix Aconiti PreparataGinger juice*Sanfu,* before and after 3 days of each *fu*Once per *fu,* 3 *fu*sDesloratadine tablets (Xinminting), 5 mg, qd + triamcinolone acetonide nasal spray (Xinruike), Each nostril 1 spray, daily, 1 month11–12 months after treatment finishedER-[52] Sun 2007[41]*Sanfu,* AHP+WM *versus* WMBL13, RN17, DU14, BL17, BL20, BL23Semen Sinapis, Herba Asari, Radix Kansui, Radix Angelicae Dahuricae, Cortex Cinnamomi, Flos CaryophylliGinger juice*Sanfu,* first day of each *fu*Once per *fu* (first day of *fu*), keep patching 3–6 h, *3 fus*Azelastine hydrochloride tablet (Minqipian) with 1% Dexamethasone droplets of ephedrine nasal fluid and 2% sodium cromoglycate nasal drops, alternatively6 months after treatment finishedRecurrence rate, Clinical symptom score-2004, ER-2004[50] Wu 2013[44]*Sanfu,* AHP+WM *versus* WMBL43, DU14, BL12, BL13, BL20, BL23, ST36, BL26, BL24Semen Sinapis, Herba Asari, Radix Kansui, Herba Ephedrae, Radix ScutellariaeGinger juice*Sanfu,* first day of each *fu*Once per *fu* (first day of *fu*), keep patching 2–6 h, *3 fu*sLoratadine, 10 mg, qd + beclomethasone dipropionate aqueous nasal Ssray, 3 tid, 10 daysAfter treatment finishedClinical symptom score-1997, ER-1997[49] Zhang 2012[46]*Sanfu* AHP *versus* WM-sublingual SITDU14, BL13, BL20, BLI4Radix Astragali, Flos Magnoliae Liliflorae, Fructus Gleditsiae, Semen Sinapis, Herba Asari, Rhizoma CorydalisSuccus Rhizomatis Zingiberis*Sanfu,* first day of each *fu*Once per *fu*, keep patching 2–4 h, 3 *fu*sFenchenmandiji (changdi), by sublingual, 1 yearAfter treatment finishedER-1997[49], IgE, EOS, Adverse event Ref., reference; WM, Western medicine; Qol, quality of life; ER, clinical manifestation improvement effectiveness rate; RQLQ, Rhinoconjunctivitis Quality of Life; SF-36, the 36-item Short Form Health Survey.

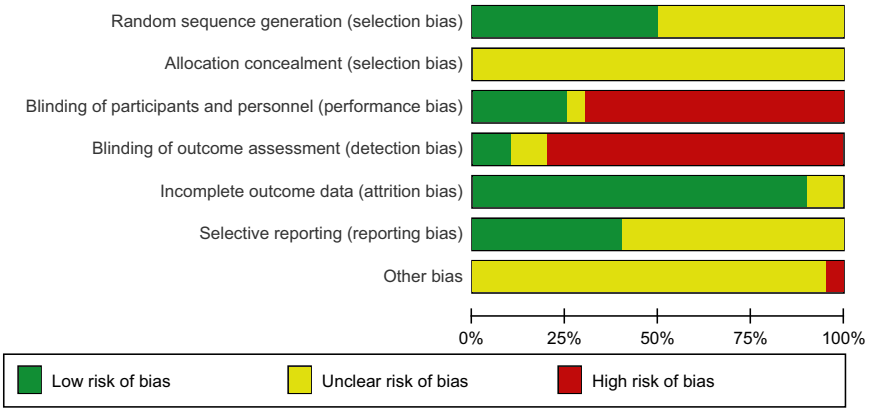

Fig. 2. Risk of bias graph. Presentation of the risk of bias graph of the review author's judgments about each risk of bias item presented as percentages across all included trials.

no significant difference between AHP and placebo in decreasing the level of serum IgE.[29]

Adverse events. Four trials mentioned adverse events of AHP therapy.[35,39,40,46] Three trials reported none.[35,39,46] One trial reported obvious burning pain in the patching areas and redness around it in two patients, but these symptoms gradually disappeared after half an hour.[40] Although Hsu's trial did not mention the adverse events, it reported two participants' withdrew due to the occurrence of local pain and blisters.[29]

Discussion

Summary of main results

This review of 20 RCTs found that either within 3 months or more than 3 months, AHP appeared to be more effective than placebo on total improvement rate of clinical symptoms and signs. However, it is difficult to translate into clinical language due to compound several indicators. On other hand, the improved degree of mean score of RQLQ was obvious, which is enough for raising the AR patients' symptoms from severely impaired level to moderately impaired or from moderately to mildly impaired. Although AHP applied alone or in combination with Western medicine appeared to be more efficacious in reducing recurrence rate at 6 months, we could not draw clinical conclusion due to only one individual trial with high risk bias. No serious adverse events were reported. Thus, AHP might be safe for AR.

Overall completeness and applicability of evidence

The evidence of this review covered different groups of people with AR, including adolescents, adults and the elderly, with different length of disease course. So, the extrapolation of this review can be acceptable in various populations.

However, inadequate reporting information hindered us to make clear judgment of the quality of included trials and draw conclusions for clinical practice. For example, 17 trials did not report the type and severity of AR, and 16 trials failed to offer TCM diagnosis (syndrome differentiation).

Quality of evidence and potential biases in review

The poor methodological quality of included trials indicated high risk of bias. Selection bias could happen because only half of trials reported randomisation methods and no trial offered information about allocation concealment. Besides, 15 trials did not apply any blinding directly inducing the potential performance bias and detection bias. Deficiency of sample size calculation was also a defect because statistical power cannot be guaranteed. Above existing possible biases may lead to deviation from the true value of evaluated intervention.

Three of 11 meta-analyses showed moderate degree of heterogeneity. Poor methodological quality might partly be the reason. Other reasons might be the complexity of the usual treatment in the real clinical scenario, such as the disease type of participants, different Western medicines, acupoints selected and herbs selected. Therefore, the findings must be interpreted prudently.

Comparison with other reviews

A previous review published in Chinese by Shen *et al.*[27] assessed AHP for AR found that AHP appeared to have a potential effect. Similarly, our review involving doubled participants than Shen's review also demonstrated that AHP appeared to be effective. However, Shen's review had only

Table 3. Estimate effect of AHP for improving clinical outcomes of patients with allergic rhinitis

Trial ID	Total No. of participants	Effect estimates ([95% CI])	*P* value
Outcome judgment time ≤3 months			
1. Total clinical symptoms and signs improvement		RR ([95% CI])	
1.1 AHP *versus* Placebo			
Wang 2013[42]	54	5.74 [1.86, 17.46]	0.002
Zhang 2007[47]	60	4.14 [2.16, 7.95]	<0.0001
Pooling analysis 1.1 (I^2 = 0%)	114	4.61 [2.61, 8.14]	<0.00001
1.2 AHP *versus* WM			
Hu 2010[30]	120	1.14 [1.00, 1.31]	
Liu 2011[35]	302	1.30 [1.14, 1.48]	
Mi 2011[38]	93	0.94 [0.81, 1.09]	
Shi 2011[39]	60	0.92 [0.69, 1.21]	
Wen 2007[43]	236	0.99 [0.90, 1.09]	
Xu 2012[45]	90	0.80 [0.66, 0.98]	
Zhang 2012[46]	60	1.25 [0.93, 1.69]	
Pooling analysis 1.2 (I^2 = 76%)	961	1.04 [0.92, 1.17] *Random	0.56
1.3 AHP+WM *versus* WM			
Liao 2011[33]	76	1.09 [0.94, 1.26]	
Song 2013[40]	69	1.14 [0.96, 1.36]	
Sun 2007[41]	308	1.31 [1.14, 1.51]	
Wu 2013[44]	84	1.14 [0.98, 1.33]	
Pooling analysis 1.3 (I^2 = 0%)	537	1.22 [1.12, 1.33]	<0.00001
2. Symptom-sneezing score		MD ([95% CI])	
2.1 AHP *versus* Placebo			
Hsu 2010[29]	33	−0.41 [−1.10, 0.29]	
Wang 2013[42]	54	−0.62 [−1.16, −0.07]	
Pooling analysis 2.1 (I^2 = 0%)	87	−0.54 [−0.97, −0.11] Std. Mean Difference	0.01
2.2 AHP *versus* WM			
Shi 2011[39]	60	−0.73 [−1.13, −0.33]	0.0004
2.3 AHP+WM *versus* WM			
Song 2013[40]	69	−0.32 [−0.54, −0.10]	0.005
3. Symptom-rhinorrhea score			
3.1 AHP *versus* Placebo			
Hsu 2010[29]	33	−0.30 [−0.99, 0.39]	
Wang 2013[42]	54	−0.50 [−0.94, 0.06]	
Pooling analysis 3.1 (I^2 = 0%)	87	−0.44 [−0.81, −0.07]	0.02
3.2 AHP *versus* WM			
Shi 2011[39]	60	−0.03 [−0.38, 0.32]	0.87
3.3 AHP+WM *versus* WM			
Song 2013[40]	69	−0.37 [−0.57, 5. −0.17]	0.0003
4. Symptom-stuffiness score			
4.1 AHP *versus* Placebo			
Hsu 2010[29]	33	−0.56 [−1.11, −0.00]	
Wang 2013[42]	54	−0.53 [−0.86, −0.20]	
Pooling analysis 4.1 (I^2 = 0%)	87	−0.54 [−0.82, −0.25]	0.0002
4.2 AHP *versus* WM			
Shi 2011[39]	60	0.03 [−0.33, 0.39]	0.87
4.3 AHP+WM *versus* WM			
Song 2013[40]	69	−0.37 [−0.64, −0.10]	0.007
5. Symptom-itchy nose score			
5.1 AHP *versus* Placebo			
Hsu 2010[29]	33	−0.16 [−0.68, 0.37]	

Table 3. continued

Trial ID	Total No. of participants	Effect estimates ([95% CI])	*P* value
Wang 2013[42]	54	−0.71 [−1.11, −0.31]	
Pooling analysis 5.1 (I^2 = 63%)	87	−0.46 [−1.00, 0.08]	0.10
5.2 AHP *versus* WM			
Shi 2011[39]	60	0.04 [−0.42, 0.50]	0.86
5.3 AHP+WM *versus* WM			
Song 2013[40]	69	−1.04 [−7.14, 5.06]	0.008
6. Sign-turbinate and nasal mucosa status score			
6.1 AHP *versus* Placebo			
Wang 2013[42]	54	−0.90 [−1.30, −0.50]	<0.00001
7. Sign-nasal mucosa colour score			
7.1 AHP *versus* Placebo			
Wang 2013[42]	54	−0.67 [−1.22, −0.12]	0.02
8. Quality of life			
8.1 AHP *versus* Placebo			
Hu 2012[31]	48	−8.00 [−14.65, −1.47]	
Wang 2013[42]	54	−9.73 [−15.87, −3.59]	
Pooling analysis 7.1 (I^2 = 0%)	102	−8.92 [−13.39, −4.45]	<0.00001
Hsu 2010 (Physical function)[29]	33	0.67 [−3.99, 5.32]	0.78
Hsu 2010 (Role limitation due to physical problems)[29]	33	1.85 [−21.63, 25.34]	0.88
Hsu 2010 (Body pain)[29]	33	−5.34 [−16.63, 5.94]	0.35
Hsu 2010 (General health)[29]	33	1.25 [−9.15, 11.64]	0.81
Hsu 2010 (Vitality)[29]	33	−0.67 [−12.13, 10.80]	0.91
Hsu 2010 (Social functioning)[29]	33	3.33 [−5.80, 12.47]	0.47
Hsu 2010 (Role limitation due to emotional problems)[29]	33	7.04 [−17.15, 31.22]	0.57
Hsu 2010 (Mental health)[29]	33	−4.13 [−15.16, 6.89]	0.46
9. Biomarker-IgE			
9.1 AHP *versus* Placebo			
Hsu 2010 (serum)[29]	33	136.23 [−101.19, 373.66]	0.26
9.2 AHP *versus* WM			
Liu 2011 (serum)[35]	302	−328.00 [−329.18, −326.81]	<0.00001
Zhang 2012 (serum)[46]	60	19.00 [17.66, 20.34]	<0.00001
10. Biomarker-EOS			
10.1 AHP *versus* Placebo			
Hsu 2010 (serum)[29]	33	−2.18 [−136.80, −132.43]	0.97
10.2 AHP *versus* WM			
Zhang 2012 (nasal mucosa)[46]	60	2.42 [1.67, 3.17]	<0.00001
Outcome judgment time >3 months			
1. Recurrence rate of AR		RR ([95% CI])	
1.1 AHP *versus* WM			
Liu 2011[35]	302	0.52 [0.42, 0.64]	<0.00001
1.2 AHP+WM *versus* WM			
Sun 2007[41]	290	0.53 [0.44, 0.65]	<0.00001
2. Total clinical symptoms and signs improvement		RR ([95% CI])	
2.1 AHP *versus* Placebo			
Mi 2010 (3 months)[37]	316	4.85 [3.42, 6.89]	<0.00001
Mi 2010 (6 months)[37]	316	6.33 [4.23, 9.49]	<0.00001
2.2 AHP *versus* WM			
Kong 2010[32]	100	1.23 [1.05, 1.44]	
Lin 2013[34]	60	1.39 [1.00, 1.94]	
Wen 2007 (6 months)[43]	236	1.31 [1.10, 1.57]	
Xu 2012 (12 months)[45]	90	1.63 [1.10, 2.42]	

Table 3. continued

Trial ID	Total No. of participants	Effect estimates ([95% CI])	*P* value
Zhu 2010[48]	91	1.37 [1.11, 1.70]	
Pooling analysis 2.2 (I^2 = 0%)		1.35 [1.22, 1.49]	<0.0001
Wen 2007 (12 months)[43]	236	1.50 [1.18, 1.91]	0.001
2.3 AHP+WM *versus* WM			
Liao 2008[33]	76	2.17 [1.29, 3.63]	
Ma 2012[36]	120	1.33 [1.11, 1.59]	
Pooling analysis 2.3 (I^2 = 74%)	196	1.62 [0.96, 2.73]*Random	0.07
3. Symptom-sneezing score		MD ([95% CI])	
3.1 AHP *versus* Placebo			
Wang 2013[42]	54	−0.41 [−0.77, −0.05]	0.03
4. Symptom-rhinorrhea score			
4.1 AHP *versus* Placebo			
Wang 2013[42]	54	−0.35 [−0.89, 0.19]	0.20
5. Symptom-stuffiness score			
5.1 AHP *versus* Placebo			
Wang 2013[42]	54	−0.23 [−0.62, 0.16]	0.25
6. Symptom-itchy nose score			
6.1 AHP *versus* Placebo			
Wang 2013[42]	54	−0.38 [−0.84, 0.08]	0.10
7. Sign-turbinate and nasal mucosa status score			
7.1 AHP *versus* Placebo			
Wang 2013[42]	54	−0.80 [−1.19, −0.41]	<0.0001
8. Sign-nasal mucosa colour score			
8.1 AHP *versus* Placebo			
Wang 2013[42]	54	−0.88 [−1.42, −0.34]	0.001
9. Quality of life			
9.1 AHP *versus* Placebo			
Hu 2012[31]	48	−7.20 [−13.88, −0.52]	
Wang 2013[42]	54	−10.62 [−16.83, −4.41]	
Pooling analysis 5.1 (I^2 = 0%)	102	−9.03 [−13.58, −4.49]	<0.0001

RR, risk ratio; MD, mean difference.
*Random effects model.

two comparisons (AHP *versus* Western medicine and AHP plus Western medicine *versus* same Western medicine), and our review added the comparison of AHP with placebo. In addition, Shen's review only reported the total improvement rate of clinical symptoms and signs, while our review evaluated the potential effect of AHP using patient important outcomes, such as the recurrence rate of AR, individual symptoms and quality of life.

Implications for clinical practice

We inferred that AHP may be safe and can be applied for people with AR. Acupoint herbal patching alone or combined with Western medicine may decrease the recurrence rate of AR and improve the quality of life. Due to insufficient evidence, the value for laboratory biomarkers is still unclear.

For the formula of AHP and selected acupoints, we sorted the top five ingredients of AHP and selected acupoints. The top five herb ingredients were *semen sinapis, herba asari, radix kansui, rhizoma corydalis and rasix aconiti peaparata*. According to TCM, all the properties and flavour of them are acrid-warm and penetrating which could benefit *qi*, dispel cold, reduce swelling and dissipate blood stasis.[53] Most of the top five selected acupoints (DU14, BL13, BL20, BL23 and BL12) belong to bladder meridian. Pasting AHP on these acupoints could help warm *yang*, free nasal orifices, ventilate *lungs*, invigorate *spleen* and dissolve sputum.[15] Hence, for the clinical health professionals, using them as the basic herbs and basic acupoints for AR treatment is suggested.

Due to small total number of trials included, we failed to compare *sanfu* with non-*sanfu* AHP for the effectiveness.

Thus, we could not infer the better pasting season of AHP for health professionals.

Implications for research

We have following suggestions for future research:

1 Improving Methodology Quality: It is highly recommended to register the protocols of trials and report the registration in their publications to avoid selective outcome reporting. Besides, sample size calculation should be performed in trial design and be reported. Detailed randomisation and allocation concealment should be reported. Although using blinding for medical professionals is still a challenge on AHP, it is possible to blind outcome assessor and/or statistician. In addition, we suggest to conducting intention-to-treat analysis, especially for evaluating long-term effect of AHP treatment. Although no serious adverse events were reported in the included trials, we suggest further research could conduct large-scale long-term observational study or survey to investigate the safety of AHP.

2 Selecting Patient Important Outcomes: We found few trials reporting recurrence rate of AR and individual symptoms which are important concerns of patients with AR. Accordingly, we suggest further research select patient important outcomes such as recurrence rate of AR, specific clinical symptom and quality of life.

3 Taking the Characteristics of AR Itself into Account: Unfortunately, there were few included trials reporting information about the AR itself in this review, which makes the reader need to understand the findings more cautiously. It is advisable to take the characteristics of AR itself into account during study, such as AR type, allergen and onset seasons. First, AR type should be classified clearly. Mixing them up will only lead to confusion. Moreover, researchers need to set follow-up time long enough according to different onset seasons, at least to cover the next onset season to evaluate the effectiveness of AHP for AR.

4 Clearly Reporting of AHP Trials: In this review, many information were not clearly reported. Clear, transparent and sufficiently detailed information related to RCTs is important for readers. Future trial reports should comply with the Consolidated Standards of Reporting Trials Statement (CONSORT)[54] and Standards for Reporting Interventions in Controlled Trials of Acupuncture (STRICTA),[55] considering AHP involving both Chinese medical herbs and acupuncture points. In addition, the Chinese medicine syndrome diagnostic criteria used in the trials should be elaborated clearly, which could provide more information for potential users' evaluation and application. Future trial could follow the TCM professional syndrome diagnostic criteria such as criteria of diagnosis and therapeutic effect of TCM and clinical guideline of new drugs for TCM.[51,52]

Conclusion

Acupoint herbal patching alone or combined with Western medicine appears to be more effective than placebo or medication alone in managing patients with AR. Acupoint herbal patching seemed to be a safe intervention. However, due to poor methodological quality, the findings should be interpreted with caution. Further large, rigorously designed trials are warranted to confirm the findings.

Keypoints

- Currently, there appears a potential effect for acupoint herbal patching in allergic rhinitis treatment.
- A systematic review of the available literature showed that acupoint herbal patching alone may reduce the recurrence rate at 6 months.
- Acupoint herbal patching appeared to be more effective than placebo in improving quality of life for short term and long term.
- More rigorous multicentre, larger, adequately powered randomised controlled trials that evaluate acupoint herbal patching for different types of allergic rhinitis on patient important outcomes are warranted.

Acknowledgments

Zhou F and Liu JP were supported by the Program for Innovative Research Team (2011-CXTD-09) of Beijing University of Chinese Medicine. The work was partially supported by the Program for the Model of Building Clinical Research Capacity for Chinese Medicine (grant no. 201207007) from the State Administration of Traditional Chinese Medicine of China, the programme for Young Faculty Fellow Plan of Beijing University of Chinese Medicine (2012-QNJSZX012) and the programme for Young Talents Plan of Beijing Municipal Education Commission (2013-YETP-0796). Liu J.P. was partially supported by the Ba Gui Scholarship from Guangxi Zhuang Autonomous Region.

Thank Dr. Cui Lujia, who is from Department of Otorhinolaryngology (ENT) of the Third Hospital affiliated to Beijing University of Chinese Medicine for her expert support of Chinese medicine knowledge.

Thank Dr. Amir Reza Golchian, who is from International school of Beijing University of Chinese Medicine for his invaluable help in the revision of this manuscript.

Author contributions

Zhou Fen and Liu Jian-Ping conceived and designed the review; Zhou F and Yan Li-Jiao searched trials; Zhou F, Yan LJ and Liu JP appraised trials; Zhou F and Yan LJ extracted data; Zhou F and Liu JP synthesised and analysed date; and Zhou F, Liu JP and Yang Guo-Yang wrote the paper.

Conflict of interests

None to declare.

References

1 Bousquet J., Khaltaev N., Cruz A.A. *et al.* (2008) Allergic rhinitis and its impact on asthma (ARIA) update (in collaboration with the World Health Organization, GA(2)LEN and AllerGen). *Allergy* **63**, 8–160

2 Tunis O. & Murat S. (2012) The burden of allergic rhinitis and asthma. *Ther. Adv. Respir. Dis.* **6**, 11–23

3 Zhang Y. & Zhang L. (2014) Prevalence of allergic rhinitis in China. *Allergy Asthma Immunol. Res.* **6**, 105–113

4 Canonica G.W., Bousquet J., Mullol J. *et al.* (2007) A survey of the burden of allergic rhinitis in Europe. *Allergy* **62**, 17–25

5 Sardana N. & Craig T.J. (2011) Congestion and sleep impairment in allergic rhinitis. *Asian Pac. J. Allergy Immunol.* **29**, 297–306

6 Schatz M. (2007) A survey of the burden of allergic rhinitis in the USA. *Allergy* **62**, 9–16

7 Walker S., Khan-Wasti S., Fletcher M. *et al.* (2007) Seasonal allergic rhinitis is associated with a detrimental effect on examination performance in United Kingdom teenagers: case–control study. *J. Allergy Clin. Immunol.* **120**, 381–387

8 Valovirta E. & Pawankar R. (2006) Survey on the impact of comorbid allergic rhinitis in patients with asthma. *BMC Pulm. Med.* **6**, 1–10

9 Feng C.H., Miller M.D. & Simon R.A. (2012) The united allergic airway: connections between allergic rhinitis, asthma, and chronic sinusitis. *Am. J. Rhinol. Allergy.* **26**, 187–190

10 Blaiss M.S. (2010) Allergic rhinitis: direct and indirect costs. *Allergy Asthma Proc.* **31**, 375–380

11 Denise K.S. & Stephanie S. (2010) Treatment of allergic rhinitis. *Am. Fam. Physician* **81**, 1440–1446

12 Steinsvaag S.K. (2012) Allergic rhinitis: an updated overview. *Curr. Allergy Asthma Rep.* **12**, 99–103

13 Incorvaia C., Di Rienzo A., Celani C. *et al.* (2012) Treating allergic rhinitis by sublingual immunotherapy: a review. *Ann. Ist. Super. Sanita.* **48**, 172–176

14 Lorraine W. (2009) San fu moxibustion and lung-related disorders. *J. Chin. Med.* **89**, 14–20

15 Cheng X.N. (2012) *Chinese Acupuncture and Moxibustion*. Foreign Languages Press, Beijing

16 Mo W.D. (1988) *Overview of Acupoint Application Therapy*. Guangxi Nationalities Publishing House, Nangning

17 Zhang L. (1990) *Zhang Shi Yi Tong*. Shanghai Science Technology Publications, Shanghai

18 Beijing Chinese Medicine Information Nets. (2014) The list of *sanfu* acupoint application therapy service agencies in Beijing in 2014 [WWW document]. URL http://www.bjtcm.gov.cn [accessed on 1 July 2014]

19 Fang F. & Han L. (2010, July 20) *Winter disease treated in summer season citizens are sealing for Sanfu patches*. Beijing Daily, 5 [WWW document]. URL http://www.bjtcm.gov.cn [accessed on 1 July 2014]

20 Chen J., Yang T., Lai X.S. *et al.* (2008) Effect of acupoints external application of herbal drug on blood cell classification and serum specific IgE level of allergic rhinitis mice. *J. Guangzhou Univ. Tradit. Chin. Med.* **4**, 304–306

21 Zheng Q.Z. (2009) *The experimental study on acupoints application in treating allergic rhinitis*. Postgraduate Thesis, Guangzhou Univ of Chin Med, Guangzhou.

22 Tai C.J., Chang C.P., Huang C.Y. *et al.* (2006) Efficacy of Sanfujiu to treat allergies: patient outcomes at 1 year after treatment. *Evid. Based Complement. Alternat. Med.* **4**, 241–246

23 Li X.P. (2010) The regulating function of acupoint herbal patching for serum Th1 and Th2 cell factors on perennial allergic rhinitis patients. *J. New Chin. Med.* **42**, 82–83

24 Shi C.J. (2008) Effect of winter disease treated during summer vesiculation moxibustion treatment for allergic rhinitis. *J. Clin. Acupunt. Mox.* **24**, 37–39

25 Hu Y.H., He X.H. & Han M. (2011) The clinical observation on acupoint herbal patching for allergic rhinitis. *Ningxia Med. J.* **33**, 1127–1128

26 Cao S., Sun C.Y. & Zhang L. (2011) Acupoint herbal patching for 80 people with allergic rhinitis. *J. External Ther. Tradit. Chin. Med.* **20**, 24–25

27 Shen X., Fu L.X., Zhu Y. *et al.* (2013) The effectiveness of *sanfutie* for allergic rhinitis: a meta analysis. *Henan Tradit. Chin. Med.* **33**, 449–452

28 Higgins J.P.T. & Green S. (2011) *Cochrane Handbook for Systematic Reviews of Interventions, Version 5.1.0* [WWW document]. URL www.cochrane-handbook.org [accessed on 15 February 2012]

29 Hsu W.H., Ho T.J., Huang C.Y. *et al.* (2010) Chinese medicine acupoint herbal patching for allergic rhinitis: a randomised controlled clinical trial. *Am. J. Chin. Med.* **38**, 661–673

30 Hu Y.L. & Sun G. (2010) The effect of acupoint herbal patch on dog days for treating allergic rhinitis in 60 patients. *Nei Mongol. J. Tradit. Chin. Med* **29**, 82

31 Hu N., Deng G., Xian P.F. *et al.* (2012) Effect of point application therapy on the life quality of patients with perennial allergic rhinitis. *Shanghai J. Acupunct. Mox.* **31**, 100–102

32 Kong Y.M. (2010) Clinical observation on vesiculation moxibustion treatment for allergic rhinitis. *Hubei J. Tradit. Chin. Med.* **32**, 49–50

33 Liao X.Y. (2008) *Clinical study on effect of point application of herb and western medicine on treating perennial allergic rhinitis*. Postgraduate Thesis, Hubei Univ of Chin Med, Wuhan

34 Lin Y.X., Zhang Q.F., Fan L.Y. *et al.* (2013) The clinical research of crude herb moxibustion on treating allergic rhinitis. *Jilin J. Tradit. Chin. Med.* **33**, 186–187

35 Liu Y. (2011) *The clinical research of emaohuoxiangli vesiculation moxibustion preventing and treating allergic rhinitis in children*. Postgraduate Thesis, Hubei Univ of Chin Med, Wuhan

36 Ma X.M. (2012) The effect of point application with kechuan plaster on treating allergic rhinitis. *Zhejiang J. Tradit. Chin. Med.* **47**, 807

37 Mi J.P. & Yu Z.S. (2010) Clinical observation on vesiculation moxibustion treatment for allergic rhinitis. *Shanghai J. Acupunct. Mox.* **29**, 773–775

38 Mi J.P. & Yu Z.S. (2011) Comparative analysis of clinical effect on treating allergic rhinitis with point application therapy and inhaled corticosteroid therapy. *J. Liaoning Univ. Tradit. Chin. Med.* **13**, 59–60
39 Shi Y.J. (2011) *Point application in treating allergic rhinitis' clinical research*. Postgraduate Thesis, Changchun Univ of Chin Med, Changchun
40 Song P. (2013) The effect of point application therapy on treating allergic rhinitis. *Chin. J. Inform. Tradit. Chin. Med.* **20**, 74–75
41 Sun J., Tao X. & Zhu Z.H. (2007) Effect of point application therapy on patients with allergic rhinitis. *J. Tradit. Chin. Med. Univ. Hunan* **27**, 63–64
42 Wang N.N. (2013) *A clinical research of days moxibustion therapy for allergic rhinitis*. Postgraduate Thesis, Southern Med Univ, Guangzhou
43 Wen Z., Xu S.Q., Peng B. *et al.* (2007) The effect of point application therapy on preventing and treating allergic rhinitis in 118 patients. *Hunan J. Tradit. Chin. Med.* **23**, 32–33
44 Wu W.X. (2013) The effect of point application therapy for treating allergic rhinitis. *Chin. J. Pharm. Econ.* **6**, 237–238
45 Xu X.F. (2012) Clinical observation on acupoint herbal patch for treating 90 patients with allergic rhinitis. *Zhongguo Shiyong Xiangcun Yisheng Zazhi.* **19**, 52–53
46 Zhang J.J. (2012) *Acupoint sticking prevention in children with allergic rhinitis clinical research*. Postgraduate Thesis, Hubei Univ of Chin Med, Wuhan
47 Zhang J.C. (2007) *Clinical study on crude herb moxibustion for treatment of children allergic rhinitis*. Postgraduate Thesis, Guangzhou Univ of Chin Med, Guangzhou
48 Zhu S.N. (2010) The effect of acupoint herbal patch on dog days for treating allergic rhinitis. *Chin. Gen. Pract. Nurs.* **8**, 2942
49 Society of Otorhinolaryngology of Chinese Medical Association. (1998) Criteria of diagnosis and response evaluation in allergic rhinitis (1997 Revision). *Chin. J. Otorhinolaryngol.* **33**, 6–7
50 Gu Z.Y. & Dong Z. (2005) The principles of diagnosis and treatment recommendations for allergic rhinitis (2004 Revision). *Chin. J. Otorhinolaryngol. Head Neck Surg.* **3**, 8–9
51 State Administration of Traditional Chinese Medicine. (1994) ZY/T001.4-94. *Ear Nose Throat (ENT) diseases. In: Criteria of Diagnosis and Therapeutic Effect of Traditional Chinese Medicine*. Nanjing University Press, Nanjing
52 Zheng X.Y. (2002) *Clinical Guideline of New Drugs for Traditional Chinese Medicine*. Medicine Science and Technology Press of China, Beijing
53 Nanjing University of Chinese Medicine. (2013) *The Dictionary of Medicinal Plant*. Shanghai Science and Technology Press, Shanghai
54 Boutron I., Moher D., Altman D.G. *et al.* (2008) Extending the CONSORT statement to randomised trials of nonpharmacologic treatment: explanation and elaboration. *Ann. Intern. Med.* **148**, W60–W66
55 MacPherson H., White A., Cummings M. *et al.* (2002) Standards for reporting interventions in controlled trials of acupuncture: the STRICTA recommendations. *Acupunct. Med.* **20**, 22–25

Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's web-site.