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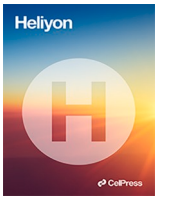

Research article

Effects of acupuncture and moxibustion on ulcerative colitis: An overview of systematic reviews

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ABSTRACT

Ulcerative colitis (UC) is a gastrointestinal disease with an unknown etiology that severely affects patients' quality of life. Acupuncture and moxibustion therapies are effective in the treatment of UC, but existing systematic reviews (SRs) and meta-analyses (MAs) on this subject have variable methodological and outcome quality. Therefore, this study aimed to summarize and evaluate the evidence of existing SRs and MAs to provide more reliable evidence for clinical practice. Data were extracted from seven databases through systematic search and evaluated in terms of the methodological quality, reporting quality, risk of bias, and quality of evidence using the AMSTAR-2, PRISMA, ROBIS, and GRADE systems, respectively. Ten studies were finally included, and all of them showed many problems with the overall design and quality of outcomes. Because of the lack of high-quality evidence to support the findings from the existing studies, we should take this conclusion with caution and strictly implement the registration, design, and implementation of trials based on evidence to provide high-quality results in future studies.

1. Introduction

Ulcerative colitis (UC) is a nonspecific recurrent inflammatory bowel disease (IBD), which is classified by the World Health Organization as one of the modern intractable diseases [1]. UC is mainly characterized by persistent and diffuse inflammation, which is limited to the colonic mucosa and extends from the proximal rectum until it involves all parts of the large intestine [2,3]. The clinical picture of UC involves typical symptoms such as abdominal pain, bloody diarrhea, and urgency [4]. The pathogenesis of UC has not yet been clarified, and existing studies suggest that it may be associated with impaired intestinal mucosal barrier function, immune disorders, and genetic susceptibility [5]. Previous studies have shown that approximately 8–14% of UC patients have a family genetic history [6], and the heritability is also reflected in different ethnic populations. For example, CARD15 (NOD2) is closely associated with the development of UC in the Chinese population, and the expression of STAT6 rs324015 gene polymorphisms also increases the risk of UC [7,8]. According to relevant epidemiological studies, the incidence of UC in recent years has been increasing globally, with more than 15 per 100,000 people in regions such as North America [9]. Because the occurrence of UC is influenced by environmental

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factors, the continuous development of industrialization in developing countries leads to an increasing trend in the prevalence rate of UC. For example, the annual incidence rate of UC in China has increased to 1.18 per 100,000 people [10].

Patients with UC often need to rush to the restroom immediately to empty their bowels, which is known as fecal urgency [11]. This phenomenon is more common in elderly patients with UC and puts a huge psychological burden on patients, thereby negatively affecting their emotional, psychological, and social functioning, as well as quality of life [12]. If UC is not cured for a long time, the repeated inflammatory stimulation increases the probability of developing colon cancer two-to threefold relative to the general population [13,14]. Therefore, it is crucial to find effective treatments for UC.

At present, 5-aminosalicylic acid, corticosteroids (CSs), and immunosuppressive agents (e.g., azathioprine) are applied to control the development of inflammation and related complications in UC, but there is no complete eradication of the disease at the level of pathogenic mechanisms [15]. Moreover, all of these drugs have their limitations. For example, azathioprine has a slow onset of action and achieves its peak effect after 17 weeks, which makes it unsuitable for patients with acute exacerbations [16]. Although CSs show effects quickly they have notable side effects and should not be used for long periods [17]. Therefore, it is important to look for more effective and economical treatments. In recent years, with the increased prevalence of UC in China [10], it has been found that traditional Chinese medicine (TCM) achieves remarkable efficacy in the treatment of UC. The advantages of TCM include a great variety of therapeutic modalities, few side effects, and high safety [18]. Thus, the treatment of UC with TCM has attracted much attention. Acupuncture therapy is one of the TCM therapies used to treat UC. It includes inserting metal needles into the body or burning moxa to generate heat to stimulate the corresponding acupoints [19,20]. Compared with other therapies, acupuncture therapy as a kind of external treatment does not harm the liver and kidney functions, and it is more economical and convenient. The effectiveness of this therapy in the treatment of UC has been confirmed in relevant clinical trials [21,22]. Moreover, basic research has shown that acupuncture can improve the recovery of intestinal mucosal barrier function and reduce inflammatory response in mice with UC [23,24].

Therefore, to provide more authentic and reliable evidence for clinical practice, a series of meta-analyses (MAs) and systematic

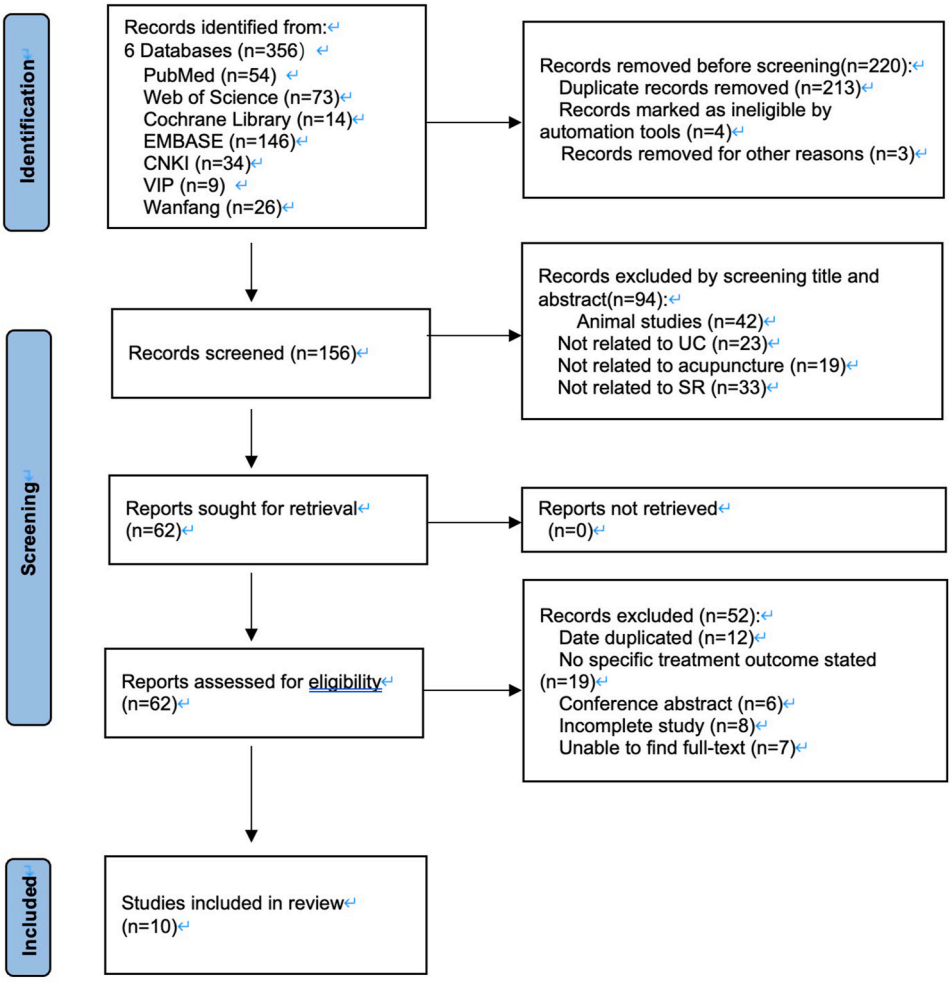

Fig. 1. PRISMA 2020 flow diagram for new systematic review diagram of article search and study selection.

Table 1
The basic characteristics of the literature.

NO.	Study-first author (publication year) Location	Language	Type of review	Trials (subjects)	Quality Assessment Tools	Overall risk of bias of primary studies	Intervention	Comparison	Adverse Effects (Number of patients; Number of RCTs) (Intervention group)	Outcome Indications	Conclusion
1	Chen [36] et al. (2018) China	Chinese	Rct	8(497)	Cochrane	Not subject to some risk of bias	Moxa	SASP; SASP + MTZ; ACTH + ACH + ISD	No mention	①②③④⑤⑥	Moxibustion has good efficacy and low incidence of adverse effects in the treatment of ulcerative colitis, but the existing studies are few in number, low in quality, and the moxibustion modality is not conducive to blinding, and there is a need to design high-quality, large-sample, standardized randomized controlled clinical trials to provide reliable evidence for the clinical treatment of UC.
2	Wang [37] et al. (2011) China	Chinese	Rct	7(1007)	Cochrane	Not subject to some risk of bias	Moxa	SASP; SASP + MTZ; SASP + PAT	No mention	①②③④⑤⑩	Moxibustion is safe and effective in the treatment of ulcerative colitis.
3	Zhao [38] et al. (2023) China	Chinese	Rct	12(874)	Cochrane	Not subject to some risk of bias	Moxa; Moxa + SASP; Moxa + MS; Moxa + Western medicine	MS; SASP; SASP + MTZ + Bifidobacterium Triptans Capsules	Nausea + Vomiting(5,3); Dizziness(1,1)	①②③⑥⑦⑧⑨⑬⑭⑮⑯⑰	Based on the results reported in the literature, moxibustion has been shown to be effective in ulcerative colitis, both in combination with other drugs and alone, with few clinical adverse events. However, these findings are based on existing studies, and further studies on the therapeutic effects of moxibustion on UC and systematic evaluation of its efficacy require further large sample and high quality RCT studies to obtain more reliable results.
4	Tu [39] et al. (2017) China	Chinese	Rct	19(1253)	Cochrane	Some risk of bias may exist	Moxa	Western medicine	Nausea + Vomiting(4,3)	①⑥⑦⑪⑬⑳	Moxibustion is better than conventional drug treatment for ulcerative colitis

(*continued on next page*)

Table 1 (*continued*)

NO.	Study-first author (publication year) Location	Language	Type of review	Trials (subjects)	Quality Assessment Tools	Overall risk of bias of primary studies	Intervention	Comparison	Adverse Effects (Number of patients; Number of RCTs) (Intervention group)	Outcome Indications	Conclusion
5	Zhang [40] et al. (2020) China	Chinese	Rct	12(970)	Cochrane	Some risk of bias	AT + Moxa	SASP; SASP + MTZ; SASP + PAT; SASP + MTZ + Aluminum thioglycollate + Procaine + saline enema	No mention	①⑥⑦⑪⑬⑳	Acupuncture and moxibustion are more effective than SASP in the treatment of UC and have a higher safety profile, but more rigorously designed multicenter, large-sample RCTs are needed to validate this due to the low quality of the included literature.
6	Wang [41] et al. (2018) China	Chinese	Rct	11(836)	Jadad	Low risk of bias	AT + Moxa; Moxa + MS; AT + Moxa + MS	SASP; MS; SASP + MTZ	Dizziness(3,2); Nausea(1,1); Vomiting(1,1)	①②③⑥⑦⑱	The clinical efficacy of acupuncture in the treatment of IBD was significantly better than that of the conventional Western medicine group, and the rate of adverse effects was lower than that of the Western medicine treatment group.
7	Lee [42] et al. (2010) Korea	English	Rct	5(407)	Cochrane	High risk of bias	Moxa	SASP; SASP + MTZ; SASP + PAT	No mention	①③④⑩⑱	Current evidence is insufficient to show that moxibustion is an effective treatment of UC. Most of included trials had high risk of bias. More rigorous studies seem warranted.
8	Yang [43] et al. (2023) China	English	Rct	4(228)	Cochrane + Jadad	Some risk of bias	AT	SSZ	No mention	①⑧⑨	Acupuncture has a positive therapeutic impact on IBD and can effectively regulate inflammatory factors in IBD patients. TNF-α, IL-8 and IL-10 are more appropriate inflammatory indicators for clinically evaluating the anti-inflammatory response in the blood of IBD patients by acupuncture.

(*continued on next page*)

Table 1 (*continued*)

NO.	Study-first author (publication year) Location	Language	Type of review	Trials (subjects)	Quality Assessment Tools	Overall risk of bias of primary studies	Intervention	Comparison	Adverse Effects (Number of patients; Number of RCTs) (Intervention group)	Outcome Indications	Conclusion
9	Wang [44] et al. (2020) China	English	Rct	13(1030)	Cochrane	Some risk of bias	AT; AT + MTZ; AT + MS; AT + MTZ + SASP	SASP; MS; MTZ; MTZ + SASP	Bleeding(1,1); Nausea(3,3); Dizziness(9,6); Vomiting(3,2)	①②⑥⑦⑧⑩⑱㉑	Both acupuncture alone and acupuncture combined with conventional medicine may be effective in treating ulcerative colitis compared to conventional medicine. Our findings must be interpreted with caution due to high or unclear risk of bias of the included trials.
10	Chen [45] et al. (2022) China	English	Rct	16(1454)	Cochrane + Jadad	Some risk of bias	AT; EA; EA + SASP; AT + MS; AT + ASA; AT + MS + flupentixton melitoxin	MTZ + SASP; SASP; Diphenoxylate Co.+ norfloxacin + berberine Co; MS; ASA; MS + flupentixton mellitoxin	No mention	①②⑥⑧⑨⑩㉒㉓㉔㉕㉖	Our study provides the latest evidence to allow us to speculate about the possible optimal MA parameters to treat patients with UC. The low number of adverse reactions and high efficacy make MA/EA a possible supplement to or replacement for traditional UC drugs. The variable parameter settings preferred by patients and acupuncturists may be an important factor limiting the wider clinical deployment of acupuncture as a potential UC therapy

SASP: sulfasalazine; MTZ: Metronidazole; ACTH: Adrenocorticotropic hormone; ACH Adrenocortical hormone.
ISD: Immunosuppressive drug; PAT: Prednisone Acetate Tablets; MS: Mesalamine; SSZ: sulfasalazine.
EA: Electroacupuncture; ASA: Amino salicylic acid; Moxa: Moxibustion; AT: Acupuncture.
① total effective rate; ② enteroscopic efficacy (enteroscopic Baron score and grading, or disease activity index, or Mayo score, or DAI); ③ serum immunoglobulins (IgA or IgG or IgM); ④ NK cells; ⑤ immune complexes; ⑥ adverse reactions; ⑦ TCM evidence score; ⑧ serum inflammatory factors (IL-6 or IL-8 or IL-10 or IL-1 or IL-2); ⑨ Tumor necrosis factor TNF-α; ⑩ T lymphocyte population ($CD4^+$, orCD8+ or, CD4+/CD8+); ⑪ blood routine; ⑫ C-reactive protein; ⑬ stool routine (or stool formation time); ⑭ red blood cell sedimentation rate; ⑮ recurrence rate; ⑯ platelet function; ⑰ regulation of BTNL2-HLA signaling pathway; ⑱ colonoscopy (mucosal lesions or e-colonoscopic pathological histology of intestinal mucosa and intestinal mucosa); ⑲ blood rheology (hematocrit, whole blood high cut viscosity, whole blood low cut viscosity, plasma viscosity, erythrocyte aggregation index, fibrinogen); ⑳ gastric electrogram; ㉑self-rating depression scale; ㉒ACTH; ㉓HADS scale; ㉔matrix metalloproteinase 9; ㉕trimetlylamine oxide TMAO; ㉖Quality of life scale.

Table 2
Results of the AMSTAR-2 assessment.

References	Item 1	Item 2*	Item 3	Item 4*	Item 5	Item 6	Item 7*	Item 8	Item 9*	Item 10	Item 11*	Item 12	Item 13*	Item 14	Item 15*	Item 16	Ranking of quality
Chen [36] et al.	Y	**N**	N	**PY**	Y	Y	**N**	PY	**Y**	N	**Y**	Y	**Y**	Y	**Y**	N	Extremely low
Wang [37] et al.	PY	**N**	N	**PY**	N	N	**N**	N	**Y**	N	**Y**	Y	**N**	N	**Y**	N	Extremely low
Zhao [38] et al.	Y	**N**	N	**PY**	PY	Y	**N**	PY	**Y**	N	**Y**	N	**Y**	Y	**Y**	N	Extremely low
Tu [39] et al.	Y	**N**	N	**N**	N	PY	**N**	N	**Y**	N	**Y**	N	**Y**	Y	**Y**	N	Extremely low
Zhang [40] et al.	Y	**N**	N	**PY**	Y	Y	**PY**	Y	**Y**	N	**Y**	Y	**Y**	Y	**Y**	N	Extremely low
Wang [41] et al.	Y	**N**	N	**PY**	Y	Y	**PY**	PY	**Y**	N	**Y**	Y	**Y**	N	**N**	N	Extremely low
Lee [42] et al.	PY	**N**	N	**PY**	PY	Y	**N**	Y	**Y**	N	**Y**	N	**Y**	Y	**Y**	Y	Extremely low
Yang [43] et al.	Y	**Y**	N	**Y**	Y	Y	**PY**	Y	**Y**	N	**Y**	Y	**Y**	Y	**Y**	Y	Low
Wang [44] et al.	Y	**Y**	N	**PY**	Y	Y	**PY**	Y	**Y**	N	**Y**	N	**Y**	N	**Y**	Y	Extremely low
Chen [45] et al.	Y	**Y**	N	**Y**	Y	Y	**PY**	Y	**Y**	N	**Y**	Y	**Y**	N	**Y**	Y	Low
Y%	80	**30**	0	**20**	60	80	**0**	50	**100**	0	**100**	60	**90**	60	**90**	60	

reviews (SRs) of acupuncture therapy for UC have been published in recent years to assess its effectiveness and safety. However, the quality of the published studies varies greatly, and the diagnostic criteria, types of treatments, and outcome metrics are highly variable, posing a challenge in clinical practice. For this reason, it is extremely important to evaluate the existing MAs and SRs of acupuncture therapy for UC, but such studies have not yet been published.

An overview of systematic evaluation is a more complete research strategy. It refers to further centralization of evidence through the existing SRs and MAs, synthesizing the information, and assessing its quality to reduce bias. Thus, it can provide clinicians with better quality evidence because it more completely and thoroughly incorporates the results of systematic evaluations, and the included information is richer [25,26]. In summary, this study aimed to assess the methodological and reporting quality of SRs of the effectiveness of acupuncture therapy for UC and to provide more reliable evidence for clinical practice.

Table 3
Results of the PRISMA checklist.

Section/ topic	Items	Chen [36] et al.	Wang [37] et al.	Zhao [38] et al.	Tu [39] et al.	Zhang [40] et al.	Wang [41] et al.	Lee [42] et al.	Yang [43] et al.	Wang [44] et al.	Chen [45] et al.	Number of Y (%)
Title	Q1 Title	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10 (100%)
	Q2 Abstract	Y	Y	Y	PY	Y	Y	Y	Y	Y	Y	9(90%)
Introduction	Q3 Rationale	PY	PY	PY	Y	PY	PY	Y	Y	PY	Y	4(40%)
	Q4 Objectives	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10 (100%)
Methods	Q5 Eligibility criteria	PY	PY	Y	Y	Y	Y	PY	Y	Y	Y	7(70%)
	Q6 Information sources	Y	PY	Y	PY	Y	Y	Y	Y	Y	Y	8(80%)
	Q7 Search strategy	N	N	N	N	N	N	N	Y	N	Y	2(20%)
	Q8 Selection process	Y	N	Y	PY	Y	PY	Y	Y	Y	Y	7(70%)
	Q9 Data collection process	PY	N	Y	Y	Y	PY	Y	Y	Y	Y	7(70%)
	Q10 Data items	Y	N	Y	N	Y	Y	Y	Y	Y	Y	8(80%)
	Q11 Study risk of bias assessment	Y	Y	Y	Y	Y	Y	PY	Y	Y	Y	9(90%)
	Q12 Effect measures	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10 (100%)
	Q13 Synthesis methods	Y	N	Y	PY	Y	Y	Y	Y	PY	Y	7(70%)
	Q14 Reporting bias assessment	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	9(90%)
	Q15 Certainty assessment	N	N	N	N	Y	PY	N	Y	N	Y	3(30%)
Results	Q16 Study selection	N	PY	PY	Y	Y	Y	N	Y	Y	Y	6(60%)
	Q17 Study characteristics	Y	PY	Y	N	Y	Y	Y	Y	Y	Y	8(80%)
	Q18 Risk of bias in studies	Y	PY	Y	N	Y	PY	PY	Y	Y	Y	6(60%)
	Q19 Results of individual studies	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	9(90%)
	Q20 Results of syntheses	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10 (100%)
	Q21 Reporting biases	N	N	Y	N	Y	Y	N	PY	Y	Y	5(50%)
	Q22 Certainty of evidence	N	N	N	N	Y	N	N	N	N	PY	1(10%)
Discussion	Q23 Discussion	Y	PY	Y	Y	Y	Y	Y	Y	Y	Y	9(90%)
	Q24 Registration and protocol	N	N	N	N	N	N	N	Y	Y	Y	3(30%)
	Q25 Support	Y	N	Y	Y	Y	Y	N	Y	Y	Y	8(80%)
Funding	Q26 Competing interests	N	N	N	N	N	N	Y	Y	Y	Y	4(40%)
	Q27 Availability of data, code and other materials	N	N	N	N	N	N	Y	N	Y	Y	3(30%)
PRISMA score		16	8	19	12	22	17	16	24	22	26	

PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; Y, yes; PY, partial yes; N, no.

Table 4
Results of the ROBIS assessment.

References	Phase 1	Phase 2				Phase 3
	Assessing relevance	Domain 1: Study eligibility criteria	Domain 2: Identification and selection of studies	Domain 3: Data collection and study appraisal	Domain 4: Synthesis and findings	RISH OF BIAS IN THE REVIEW
Chen [36] et al.	Low	Low	High	Low	High	High
Wang [37] et al.	Low	High	High	High	High	High
Zhao [38] et al.	Low	Low	High	Low	Low	Low
Tu [39] et al.	Low	Low	Low	Low	High	High
Zhang [40] et al.	Low	Low	High	Low	High	High
Wang [41] et al.	Low	Low	High	Low	Unclear	High
Lee [42] et al.	Low	Low	High	Low	High	Low
Yang [43] et al.	Low	Low	Low	Low	Low	Low
Wang [44] et al.	Low	Low	High	Low	High	High
Chen [45] et al.	Low	Low	Low	Low	Low	Low

2. Methods

2.1. Protocol and registration

The study protocol was conducted following the methodology outlined in the Cochrane Handbook for Systematic Reviews and was registered in the International Prospective Register of Systematic Evaluations (PROSPERO) under registration number CRD42023421025 (https://www.crd.york.ac.uk/PROSPERO/#recordDetails).

2.2. Search strategy

We searched seven online databases, namely PubMed, Cochrane Library, Web of Sciences, EMBASE, China National Knowledge Infrastructure, Wanfang database, and VIP Database for Chinese Technical Periodicals (VIP), from their creation to May 9, 2023, to find all systematic evaluations related to acupuncture therapy for UC.

The search terms included “acupuncture,” “moxibustion,” “needles,” “moxa,” “ulcerative colitis,” “inflammatory bowel disease,”

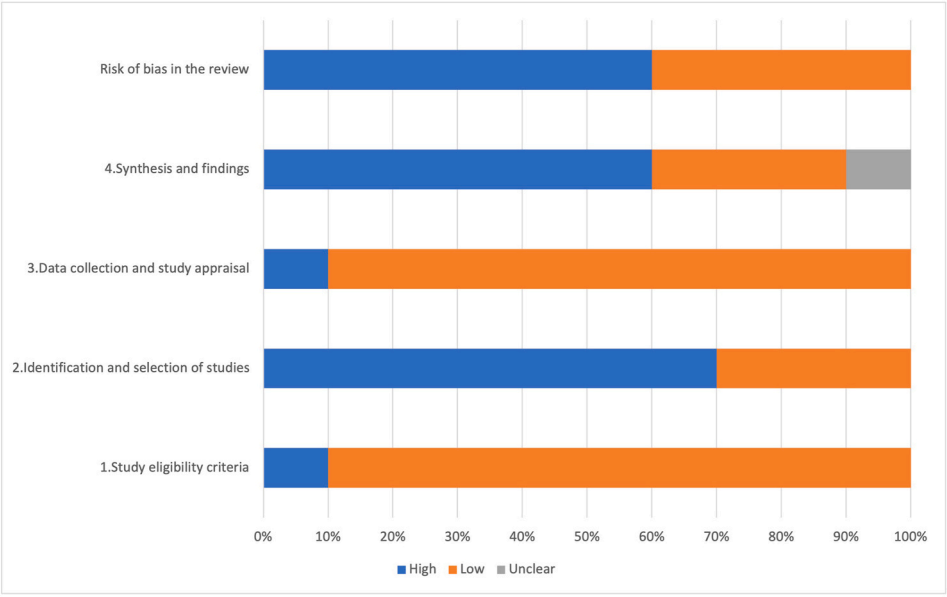

Fig. 2. ROBIS review results.

Table 5
Results of the GRADE checklist.

References	Outcomes	Intervention	Studies (participants)	Certainty assessment					Relative effect (95% CI)	*P* value	Quality of Evidence
				Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias			
Chen [36] et al.	Total effective rate	Moxa VS. SASP /SASP + MTZ/ACTH + ACH + ISD	6(199/180)	−1	0	0	−1	−1	RR = 1.32, (1.20,10.44)	*P<0.00001*	VL
	Adverse reaction	Moxa VS. SASP	2(70/74)	−1	−1	0	0	−1	RR = 0.12 , (0.02,0.89)	*P = 0.005*	VL
Wang [37] et al.	Total effective rate	Moxa VS. SASP /SASP + MTZ/SASP + PAT	7(567/440)	−1	0	0	0	−1	RR = 1.13 , (1.20,1.47)	*P<0.0001*	L
Zhao [38] et al.	Total effective rate	Moxa/Moxa + SASP/Moxa + MS/Moxa + WM VS. MS/ SASP/SASP + MTZ + BTC	12(440/434)	−1	0	0	−1	−1	RR = 1.25 , (1.17,1.32)	*P<0.00001*	VL
	Adverse reaction	Moxa/Moxa + MS/Moxa + SASP/Moxa + WM VS. MS/ SASP/WM	4(137/130)	−1	0	0	−1	−1	RR = 0.35, (0.15,0.84)	*P = 0.02*	VL
	Recurrence rate	Moxa/Moxa + MZ VS. MZ/ SASP	2(65/66	−1	−1	0	−1	−1	RR = 0.31, (0.14,0.67)	*P = 0.003*	VL
Tu [39] et al.	Total effective rate	Moxa VS. WM	19(624/629)	−1	−1	0	0	−1	RR = 1.27, (1.20,1.33)	*P = 0.525*	VL
Zhang [40] et al.	Total effective rate	AT + Moxa VS. SASP/SASP + MTZ/SASP + PAT/SASP + MTZ + WM	12(552/418)	−1	0	0	0	−1	OR = 7.32, (4.58,11.70)	*P<0.00001*	L
	Adverse reaction	AT + Moxa VS. SASP + MTZ	3(122/122)	−1	0	0	−1	−1	OR = 0.17, (0.08,0.37)	*P = 0.0001*	VL
	Stool routine	AT + Moxa VS. SASP/SASP + MTZ	2(62/60)	−1	0	0	−1	−1	OR = 4.31, (1.96,9.48)	*P = 0.0003*	VL
Wang [41] et al.	Total effective rate	AT + Moxa/Moxa + MS/AT + Moxa + MS VS. SASP/MS/ SASP + MTZ	11(419/417)	−1	0	0	0	−1	OR = 3.66, (2.41, 5.54)	*P<0.0001*	L
	Adverse reaction	AT + Moxa/Moxa + MS VS. SASP/MS	6(252/250)	−1	0	0	−1	−1	OR = 0.19, (0.07, 0.51)	*P<0.01*	VL
Lee [42] et al.	Total effective rate	AT + Moxa/Moxa + MS/AT + Moxa + MS VS. SASP/MS/ SASP + MTZ	5(245/153)	−1	0	0	0	0	RR = 1.24, (1.11,1.38)	*P<0.00001*	M
Yang [43] et al.	Total effective rate	AT VS. SSZ	4(114/114)	−1	0	0	0	0	MD = 1.22, (1.07,1.39)	*P = 0.003*	M
	TNF-α	AT VS. SSZ	4(114/114)	−1	0	0	0	0	MD = −60.58 , (−100.3, −20.86)	*P = 0.003*	M
	IL-1	AT VS. SSZ	4(114/114)	−1	−1	−1	−1	0	MD = −33.94, (−76.06,8.18)	*P = 0.11*	VL
	IL-8	AT VS. SSZ	4(114/114)	−1	0	0	0	0	MD = −56.08, (−60.02, −52.14)	*P<0.00001*	M

(*continued on next page*)

Table 5 (*continued*)

References	Outcomes	Intervention	Studies (participants)	Certainty assessment					Relative effect (95% CI)	*P* value	Quality of Evidence
	IL-10	AT VS. SSZ	4(114/114)	−1	0	0	−1	0	MD = 35.96, (11.02,60.91)	*P = 0.005*	L
Wang [44] et al.	Effective rate	AT VS. MTZ + SSZ	3(159/159)	−1	0	0	−1	0	RR = 1.19, (1.09,1.31)	P = 0.0002	L
		AT + MS VS. MS	4(116/116)	−1	0	0	−1	0	RR = 1.25, (1.10,1.41)	P = 0.0004	L
	Adverse reaction	AT VS. CM	4(209/209)	−1	−1	0	−1	0	RR = 0.52, (0.13,2.10)	P = *0.36*	VL
		AT + CM VS. CM	4(154/164)	−1	−1	0	−1	0	RR = 0.63, (0.19,2.04)	P = *0.44*	VL
	Colonoscopy result	AT + MS VS. MS	2(54/54)	−1	0	0	−1	0	RR = 1.25, (1.10,1.41)	P = *0.0004*	L
Chen [45] et al.	Effective rate	MA + Medicine	5(216/216)	−1	0	0	0	0	RR = 1.28, (1.17,1.40)	*P<0.00001*	M
	Adverse reaction	MA/EA VS. Medicine	6(296/296)	−1	0	0	0	0	RR = 0.33, (0.18,0.59)	P = *0.0002*	M
		MA/EA + Medicine VS. Medicine	5(155/155)	−1	−1	0	−1	0	RR = 0.72, (0.35,1.49)	P = *0.38*	VL
	Baron scores	MA + Medicine VS. Medicine	2(128/128)	−1	0	0	−1	0	RR = 1.31, (1.03,1.58)	*P<0.00001*	L

Moxa: Moxibustion; SASP: sulfasalazine; MTZ: Metronidazole; ACTH: Adrenocorticotropic hormone; ACH: Adrenocortical hormone; ISD: Immunosuppressive drug; PAT: Prednisone acetate tablets; MS: Mesalamine; WM: Western medicine; BTC: Bifidobacterium Triptans Capsules; AT: acupuncture; SSZ: sulfasalazine; CM: Conventional medicine; EA: electroacupuncture; RR: relative risk; OR: odds ratio; L: Low; VL: Very low; M: Moderate.

"Crohn disease," "idiopathic rectocolitis," "severe colitis," "systematic evaluation," "meta-analysis," "meta analyses," and "meta-analysis." An example of the search strategy is shown in Appendix 1. Given that some articles showed unclear conceptual distinctions between IBD, UC, and Crohn's disease (CD) during the development of the search protocol, all three were included in the search formula during the search process.

2.3. Inclusion and exclusion criteria

The PICOS framework (P—patient, problem, or population; I—intervention; C—comparison; O—outcome; and S—study design) served as the foundation for the inclusion and exclusion criteria listed in the following sections [27].

2.3.1. Inclusion criteria

The inclusion criteria were as follows:

(1) Study participants: Patients diagnosed with ulcerative colitis or IBD were included. There were no restrictions on diagnostic criteria or the age of the subjects.
(2) Study intervention: Acupuncture and/or moxibustion treatment had to be used as the primary intervention. This included traditional acupuncture, manual acupuncture, electroacupuncture, body acupuncture, head acupuncture, wrist and ankle acupuncture, moxibustion, gentle moxibustion, thunder fire moxibustion, and taiyi shenzhen. Acupuncture was used alone or in combination with Western medications or other treatments, regardless of the frequency or duration of the treatment.
(3) Study comparison: The control group was treated with acupuncture, moxibustion, Western medicine, or a combination of these three modalities.
(4) Study outcome measures: We considered the following outcomes measures: the effective rate; TCM evidence points scale; Mayo score; objective evaluation of colonoscopy with Baron score and grading; blood routine analysis (C-reactive protein); stool routine analysis; erythrocyte sedimentation rate; serum inflammatory factor; immune-related indicators (immunoglobulins, immune complexes, natural killer cells, DAI, T-lymphocytes, and tumor necrosis factor); colonoscopy; and adverse reactions.
(5) Study design: SR or MA containing more than one randomized controlled trial (RCT).

2.3.2. Exclusion criteria

The exclusion criteria were as follows:

(1) Unclear diagnostic criteria;
(2) Primarily non-needling or herbal interventions;
(3) Duplicate releases;
(4) Non-RCT study designs, such as quasi-RCTs, animal studies, basic studies, cross-sectional studies, case reports, case series, case–control studies, and cohort studies;
(5) Basic data or full text of the articles not available after contacting the original authors;
(6) Conference abstracts, letters, reviews, editorials, news reports, translations, interpretations, Ph.D. theses, and master's theses.

Table 6
Pooled overall effect size of Acupuncture interventions on effective rate.

References	Intervention	Studies (participants)	Relative effect (95% CI)	I^2	*P* value	Quality of Evidence
Zhao [38] et al.	Intermediated moxibustion	6(217/217)	RR = 1.19, (1.10,1.28)	0%	*P<0.0001*	L
	Hanging moxibustion	3(85/85)	RR = 1.40, (1.20,1.64)	71%	*P<0.0001*	VL
	Fulminating moxibustion	3(138/132)	RR = 1.26, (1.13,1.40)	0%	*P<0.0001*	VL
	Moxa	5(189/186)	RR = 1.29, (1.17,1.43)	48%	*P<0.00001*	VL
	Moxa + WM	7(251/248)	RR = 1.21, (1.13,1.30)	0%	*P<0.00001*	M
Lee [42] et al.	Moxa + SASP VS. SASP	3(190/91)	RR = 1.23, (1.04,1.46)	39%	*P = 0.01*	VL
	Moxa VS. SSZ + MTZ/SASP + PAT	2(64/62)	RR = 1.33, (1.11,1.59)	0%	*P = 0.002*	L
Wang [44] et al.	AT VS. MTZ + SSZ	3(159/159)	RR = 1.19, (1.09,1.31)	0%	P = *0.0002*	L
	AT + MS VS. MS	4(116/116)	RR = 1.25, (1.10,1.41)	0%	P = *0.0004*	L
Chen [45] et al.	AT + Medicine VS. Medicine	3(160/160)	RR = 1.26, (1.13,1.40)	0%	*P<0.00001*	M
	EA + Medicine VS. Medicine	2(56/56)	RR = 1.36, (1.13,1.63)	0%	*P = 0.001*	VL
	AT VS. MS	3(141/141)	RR = 1.20, (1.09,1.32)	0%	*P = 0.0002*	VL
	AT + MS VS. MS	2(62/62)	RR = 12.7, (1.07,1.50)	0%	*P = 0.007*	VL
	AT + MTZ + SASP VS. MTZ + SASP	3(186/186)	RR = 1.13, (1.05,1.21)	11%	*P = 0.001*	L
	EA + SASP VS. SASP	2(56/56)	RR = 1.36, (1.13,1.63)	0%	*P = 0.001*	VL

Moxa: Moxibustion; WM: Western medicine; SASP: sulfasalazine; SSZ: sulfasalazine; MTZ: Metronidazole; PAT: Prednisone acetate tablets; AT: Acupuncture; MS: Mesalamine; EA: electroacupuncture; RR: relative risk; L: Low; VL: Very low.

2.4. Study selection and data extraction

Data extraction and management were performed independently by two assessors (QW and YHW) in accordance with the defined criteria and then cross-checked. The assessors reviewed each abstract and full text and extracted relevant data from the included articles. The data were validated by the third assessor (DW). Any discrepancies were resolved by consensus. The extracted data included the first author, date of publication, country, type of study, number of studies included, number of patients, treatment-group intervention, control-group intervention, methodological assessment tool (quality assessment tool for RCTs), whether sensitivity or subgroup analyses were performed, risk of bias assessment, adverse events, outcome metrics, and main conclusions.

2.5. Evaluation methods

The quality of the included studies was evaluated by two independent reviewers (QW and YHW), and disagreements were resolved by the chief quality control officer (DW). The quality of the included SRs was evaluated prior to the formal commencement of the assessment. Specifically, the quality of the methodology, the quality of the report, the level of risk of bias, and the quality of the primary outcome were evaluated, and each assessment tool used was explored and studied in depth.

2.5.1. Assessment of the methodological quality: AMSTAR-2

We used the measurement tool AMSTAR-2 to assess the methodological quality of the included reviews. AMSTAR-2 is the latest assessment tool with 16 items, where items 2, 4, 7, 9, 11, 13, and 15 are considered critical. Each item is evaluated as "yes" (fully reported or implemented) or "no" (not reported), and items 2, 4, 7, 8, and 9 can also be evaluated as "partial yes" (not fully reported). Finally, the methodological quality was graded as follows: high quality (none or one noncritical defect); medium quality (more than one noncritical defect); low quality (one critical defect, with or without noncritical defects); and severely low quality (more than one critical defect, with or without noncritical defects) [28–30].

2.5.2. Assessment of the reporting quality: PRISMA

We used the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA 2020) checklist to assess the reporting quality. The list consists of 27 items covering a total of seven aspects of SR/MA, namely the title, abstract, introduction, methods, results, discussion, and other information [31,32]. Based on the specific completion of each study, each item was scored according to the degree of reporting, with a score of 1 if all requirements were completed, 0.5 if some were completed, and 0 if they were not mentioned. The maximum total score was 27. When the score was 22–27, the reporting was considered relatively complete; when the score was 16–21, the reporting was considered to have some deficiencies; and when the score was less than 15, the reporting was considered to have relatively severe information deficiencies.

2.5.3. Assessment of the risk of bias: ROBIS

We used ROBIS, the first tool for assessing the risk of bias in systematic evaluation, to assess the risk of bias [33]. ROBIS is divided into the following three stages: assessing relevance (optional); identifying issues related to the review process; and judging the risk of bias. The second stage covers the following four areas: the study eligibility criteria; study identification and selection; data collection and study evaluation; and synthesis and results. The third stage examines the overall risk and whether the limitations identified in any of the areas identified in the second stage have been considered. Ultimately, the risk of bias was rated as "low," "high," or "unclear," depending on the status of each study.

2.5.4. The quality of evidence: GRADE

The GRADE system is a highly recommended tool in the Cochrane Handbook for assessing the quality of evidence for inclusion in SRs and the level of quality of outcome indicators [34]. The quality of evidence was graded in terms of the following five points: limitations in study design; limitations in study execution; inconsistency of results; indirectness or imprecision of evidence; and publication bias. Ultimately, the quality of evidence was categorized as "high," "moderate," "low," and "very low [34,35]."

3. Results

3.1. Literature screening process and results

A total of 356 records were retrieved. After deduplication and screening of the titles and abstracts for relevance, 156 and 62 records were retained, respectively. After full-text screening, 10 studies [36–45] met the inclusion criteria. A flowchart of the review process is shown in Fig. 1.

3.2. General characteristics of the included literature

Ten articles were included in this study, and their publication years ranged from 2010 to 2023. Six articles [36–41]were published in Chinese, and four [42–45] articles were published in English. All 10 articles included RCTs exclusively, with a total of 109 RCTs and 8556 participants. The number of RCTs included in each study ranged from 4 to 19, with a sample size of 228–1454 participants. Only one [45] study clarified the diagnostic criteria for UC, specifically, the Consensus opinions on the diagnosis and treatment of IBD and

the World Gastroenterology Organization practice guidelines for the diagnosis and management of IBD in 2010, whereas the remaining studies did not specify the diagnostic criteria. The interventions in the treatment group included acupuncture, electroacupuncture, moxibustion, acupuncture and moxibustion, or any of these interventions in combination with Western medicines, whereas the control group used Western medicines alone. Four studies [38,39,41,44] mentioned the occurrence of adverse effects such as nausea, vomiting, dizziness, and bleeding, whereas the remaining studies did not specifically mention the occurrence of adverse effects. Seven of the 10 studies used the Cochrane scale to assess the risk of bias; one study used the Jadad scale; and two studies used both scales. The outcome indicators varied and mainly included the effective rates, Chinese medicine evidence points, Baron scores, serum inflammatory factors, immune-related indicators, and adverse effects. In terms of conclusion, most scholars believe that acupuncture and moxibustion therapies have certain advantages in the treatment of UC, but additional and higher-quality studies are needed to verify these results. The specific characteristics of the included literature are detailed in Table 1.

3.3. Methodological quality: AMSTAR-2

We used AMSTAR-2 to assess the methodological quality of the included SRs. The methodological quality was low in two [43,45] SRs and extremely low in eight [36–42,44] SRs, and there were no high-quality studies.

The results of AMSTAR-2 evaluation were closely related to the critical items 2, 4, 7, 9, 11, 13, and 15. All these 10 SRs had one or more deficiencies in the critical items and multiple noncritical deficiencies and therefore were not rated as "high quality." Regarding item 2, only three [43–45] of the 10 studies were registered in advance on relevant websites and designed in advance to review the research methodology. The comprehensive literature search strategy required by item 4 was available in full for two [43,45] studies, and the potentially relevant literature cited by these studies was identified manually. The list of excluded studies required by item 7 and the need to justify the exclusion were not available in any of the studies. However, all of the studies applied appropriate tools to assess the risk of bias of the individual studies, and all MA results were combined in a methodologically sound manner, resulting in a 100% completion rate for items 9 and 11. One study did not complete item 13, and one did not complete item 15, which are related to heterogeneity and risk of bias.

Items 1, 3, 5, 6, 8, 10, 12, 14, and 16 are noncritical. Regarding these items, one study did not report the reason for inclusion in the RCT and the source of funding for the report, so items 3 and 10 had a 0% completion rate. The completion rates for the remaining studies ranged from 30% to 80%. Specific evaluation results are detailed in Table 2.

3.4. Reporting quality: PRISMA 2020

We evaluated the reporting quality of the included literature in line with the PRISMA-2020 evaluation criteria. None of the studies completed all questions. Two [37,39] (20%) studies scored less than 15; four [36,38,41,42] (40%) studies scored between 15 and 21; and four [40,43–45] (20%) studies scored 21 and above. Items 1 (Title), 4 (Objectives), 12 (Effect measures), and 20 (Results of syntheses) were adequately reported with a 100% completion rate. According to the scoring criteria, completeness of less than 50% indicated missing information for that particular item. On that basis, the reports of items 3 (Rationale), 7 (Search strategy), 15 (Certainty assessment), 22 (Certainty of evidence), 24 (Registration and protocol), 26 (Competing interests), and 27 (Availability of data, code, and other materials) were missing, while the reports of the remaining 20 items were complete. Specific evaluation results are detailed in Table 3.

3.5. Risk of bias evaluation: ROBIS

The results of the risk of bias assessment of the included studies are presented in Table 4 and Fig. 2. The ROBIS assessment tool is divided into three main stages. The first stage was used to assess the relevance of the study topics, and the results showed that all 10 (100%) studies had a low risk of bias. The second stage was used to identify issues of concern in the review process and specifically included an assessment of four domains. Domain 1 was used to assess the level of bias in the study eligibility criteria, and the results showed that nine [36,38–45] (90%) studies had a low risk of bias. Domain 2 was used to assess bias in searching and screening of studies, and three [39,43,45] (30%) studies were found to have a low risk of bias. Domain 3 was used to evaluate data collection and study assessment, and most studies [36,38–45] (90%) were shown to be at a low risk of bias. Domain 4 was used to assess the level of bias in the synthesis and outcomes, and we found that three [38,43,45] (30%) studies had a low risk of bias, and one [41] (10%) study had an unknown risk of bias. The third stage aimed to assess the overall risk of bias of the included studies. From the results of the first two domains, we can conclude that four [38,42,43,45] (40%) studies had a low risk of bias, and the remaining six [36,37,39–41,44] (60%) studies had a high risk of bias.

3.6. Quality of evidence: GRADE

We used the GRADE system for evaluating the quality of evidence. The 10 studies contained 27 outcome results related to the effectiveness of acupuncture and moxibustion in the treatment of UC. The results showed 6 (n = 27, 22%) outcomes of moderate quality, 8 of low quality (n = 27, 30%), and 13 of very low quality (n = 27, 48%); none of the reported outcomes were of high quality. There were various downgrading factors that caused outcome indicators to be downgraded. Limitations in randomization, allocation concealment, or blinding were the most common downgrading factors in the included studies, with all (n = 27, 100%) outcome indicators downgraded as a result. This was followed by imprecision (n = 16, 59%), risk of publication bias (n = 12, 44%), and

discontinuity (n = 7, 26%), and only one outcome indicator was downgraded for indirectness (n = 1, 4%). This means that most of the experimental designs included in the studies were potentially biased in terms of randomization, allocation concealment, or blinding methods. Detailed results are presented in Table 5.

3.7. Effectiveness of acupuncture and moxibustion in UC: a subgroup analysis

The 10 studies summarized the evidence for the effectiveness of acupuncture and moxibustion in the treatment of UC (Table 5), and four studies performed MA of intervention outcomes in different subgroups (Table 6). A total of 15 pieces of outcome evidence were included, of which 2 (n = 15, 13%) were of moderate quality, 5 (n = 15, 33%) were of low quality, and 8 (n = 15, 54%) were of very low quality. Methods in the treatment group included intermediated moxibustion, hanging moxibustion, fulminating moxibustion, moxibustion, warm acupuncture, moxibustion with SASP, acupuncture, acupuncture with MS, acupuncture and Western medicine, electroacupuncture and Western medicine, acupuncture and MTZ and SASP, electroacupuncture and SASP—a total of 12 different combinations of treatments—whereas the control group was treated with Western medicines alone. The pooled effects reported in these reviews were quite inconsistent. One result [38] had a high degree of heterogeneity, even after subgroup analysis. However, the results also demonstrated the effectiveness of acupuncture and moxibustion therapies in treating UC and that the combination with Western medicines was more effective than Western medicines alone.

3.8. Adverse reactions

Four [38,39,41,44]of the 10 SRs reported the occurrence of adverse events in the intervention group. Specifically, nausea and vomiting were reported in a total of 9 patients across 6 RCTs, dizziness was reported in a total of 13 patients across 9 RCTs, and nausea was reported in 1 patient in 4 separate RCTs. Vomiting occurred in four people (three RCTs) and one person experienced bleeding. In six [36,38,40,41,44,45]SRs, MAs of the adverse reaction profiles were conducted. Although the quality of evidence was not high, the occurrence of these adverse reactions was mild and self-resolving, and the MAs showed that the intervention treatment was safer than the control treatment.

4. Discussion

In recent years, with the increasing economic level of developing countries, the number of patients with UC has been rising globally. Currently, Western treatment of UC mainly relies on symptomatic treatment with anti-inflammatory drugs such as SASP, which has poor therapeutic efficacy and may affect liver function after long-term use. Thus, it is important to seek a more effective and safer treatment. Acupuncture and moxibustion therapies are an important part of TCM and belong to the external treatment method. However, clinicians are increasingly concerned about the efficacy of acupuncture and moxibustion therapies in the treatment of UC. There is some clinical evidence on the treatment of UC with this therapy, but the quality of evidence is variable, and the results of other treatments, such as Chinese herbs and enemas, are often mixed in some studies. Thus, it is hard to reveal the real efficacy of acupuncture and moxibustion therapies in treating UC. Therefore, in this review, we systematically summarized the existing SRs and MAs of acupuncture and moxibustion therapies for the treatment of UC to exclude other interfering factors and comprehensively analyze the existing evidence.

Compared with the existing systematic evaluation and reevaluation of TCM-related external therapies for the treatment of UC, the present study is a review of the evidence for acupuncture and moxibustion therapies for the treatment of UC, which is more relevant for practical clinical application. To ensure the accuracy of the review results, pre-tests were conducted and registered prior to the review; strict and meaningful inclusion and exclusion criteria were set; and to minimize the risk of bias in the assessment, four assessment methods were used to evaluate the included studies simultaneously in this study.

We reviewed 10 articles that met the criteria. They were published between 2010 and 2023, and they involved 51 RCTs with a total of 3707 participants. There is a growing body of evidence that acupuncture and moxibustion therapies significantly improve clinical cure rates compared with Western medicine. Moreover, in terms of safety, acupuncture and moxibustion therapies have no serious adverse effects; the adverse effects that occur are mild and self-resolving; and the incidence of adverse effects is much lower than that in the control group.

We also identified a number of issues in methodology in the course of our review. The AMSTAR-2 assessment results showed that the quality of the 10 SRs was low or extremely low. The reasons for such results are closely related to the lack of key items. First of all, study design was often not defined in advance. SRs and MAs are very demanding in terms of study design and procedure; thus, advance design of the experimental program can avoid many mistakes in the research process and allow for continuously adjusting the program during the process to achieve the best research results. However, among the 10 SRs involved in this experiment, only three studies registered in advance on the relevant websites and submitted perfect research protocols, thereby reducing their risk of bias. Second, a comprehensive literature search was not conducted. Although all researchers searched more than two databases, only two studies reported a complete search strategy and also searched the gray literature to ensure the completeness of the data. Only a proper and comprehensive search of the research area can ensure correct information collection and provide more reliable research evidence. Another important aspect is the completeness of the literature exclusion list. None of the included articles provided a complete literature exclusion list, which could lead readers to question the scientific validity of the study and the veracity of the findings, thereby negatively affecting the subsequent results. We used the PRISMA-2020 evaluation criteria for a more comprehensive assessment of the quality of the studies, and the results showed that none of the studies reported everything on the list, so all reports were flawed to

varying degrees. However, four studies (20%) scored above 21 points. Incomplete reporting of inventory items mainly omitted information on protocols and registries, literature search, and other analyses. The results for the risk of bias assessment were also not optimistic. Specifically, six studies were rated as "high risk" in the ROBIS tool, mainly due to biases in the retrieval and screening process as well as in the synthesis and outcome sections. This is consistent with the results of the other scales and may have affected the reliability of the current evidence. According to the quality of evidence scores by GRADE, only six of 27 outcomes (48%) had moderate quality. The remaining studies had low- and very-low-quality results. The factors that led to the downgrading of the evidence were multiple. First, limitations in the blinding process, allocation concealment, and randomization methods in the original RCTs were the main reasons for the downgrading and consequently led to a decrease in the reliability of the results of the treatment of UC patients with acupuncture and moxibustion therapies. Second, imprecision (n = 16, 59%), risk of publication bias (n = 12, 44%), and discontinuity (n = 7, 26%) were also the reasons for the reduced quality of evidence. Small sample sizes in the original RCTs, resulting in wide 95% confidence intervals, were the main reasons for the reduced precision of the results. Most of the original RCTs were conducted in China, probably because acupuncture and moxibustion therapies originated in ancient China, and it was not until the 18th century that acupuncture research appeared in Europe and the United States [46]. Therefore, Chinese medicine practitioners are more skillful in the practical application of this therapy, and the prevalence of positive results in RCTs conducted in China compared with studies conducted in other countries is also one of the main factors contributing to the downgrading.

Based on the results of our review, we can make the following points. First, before conducting SR or MA, a complete research protocol should be designed and registered in the corresponding website to ensure the rigor of the study. In addition, during the literature search process, a complete search protocol should be presented, and a manual search of gray literature should also be performed because in many cases, due to keywords and other reasons, many documents fail to be presented directly in the system. For clinical researchers, it must be clear that acupuncture and moxibustion therapies for UC are clinically relevant, but due to their specificity, double blinding is difficult, so it is important to be more rigorous in the trial design process to provide a higher quality of clinical research trials.

This study is the first to evaluate the SRs and MAs of acupuncture and moxibustion therapies for UC, which can provide complete and comprehensive reference evidence for clinical practice. Four assessment tools, namely AMSTAR-2, PRISMA, ROBIS, and GRADE, were applied to evaluate the research methodology, reporting quality, risk of bias, and quality level of evidence of the articles. However, there are still some limitations in this process because quality assessment is a subjective process. Although we had two independent authors to conduct the assessment and a third author with more expertise to synthesize the results when there were disagreements, this process, however, also has some bias. In addition, we did not assess overlap of the original RCTs because some of them did not contact the authors to obtain the full text, which may have led to the duplicate inclusion of some studies and may also have impacted the results of this study.

5. Conclusions

In summary, acupuncture and moxibustion therapies are effective in the treatment of UC. However, the evidence and methodological quality of the currently available SRs and MAs are generally low. The results of all evaluations were synthesized, and the main issues were related to not registering for pre-trials in advance before the start of the study, ambiguous search strategies, and failure to report conflict of interest statements and provide proof of funding sources. According to the analysis of the most original data, imprecision of the blinding of RCTs is also one of the important reasons for the low quality of the outcomes. Therefore, researchers can improve the design of research protocols in future studies based on the current shortcomings. They should be stricter in controlling RCTs and must clearly state the conflict of interest. It is important to seek effective treatments for UC patients. Although the results of many studies have proven that acupuncture and moxibustion therapies are meaningful for the treatment of UC, we must prove this from the perspective of evidence-based medicine with objective factual data. In future research, designing and completing the trials in line with the rigorous scientific guidance method is essential.

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Ethics declarations

Informed consent was not required for this study because this article is an overview and does not involve private patient information.

Data availability statement

Data included in article/supp. material/referenced in article.

CRediT authorship contribution statement

Dan Wang: Writing – original draft, Supervision, Methodology. **Qi Wang:** Resources, Conceptualization. **Yunhe Wang:** Writing – review & editing, Investigation. **Ting Li:** Validation, Supervision, Data curation. **Mi Tian:** Validation, Data curation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

List of abbreviations

SRs	systematic reviews
MAs	meta-analyses
UC	Ulcerative colitis
IBD	inflammatory bowel disease
CSs	corticosteroids
TCM	traditional Chinese medicine
CD	Crohn's disease
RCT	randomized controlled trial

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2024.e27524.

References

[1] X. Wang, F. Liang, Z. Dai, et al., Combination of Coptis chinensis polysaccharides and berberine ameliorates ulcerative colitis by regulating gut microbiota and activating AhR/IL-22 pathway, J. Ethnopharmacol. 318 (2024) 117050, https://doi.org/10.1016/j.jep.2023.117050.
[2] J.D. Feuerstein, A.C. Moss, F.A. Farraye, Ulcerative colitis, Mayo, Clin. Proc. 94 (2019) 1357–1373, https://doi.org/10.1016/j.mayocp.2019.01.018.
[3] Y. Zhang, J. Zhao, Y. Zhao, et al., The Rhei radix rhizoma-based carbon dots ameliorates dextran sodium sulphate-induced ulcerative colitis in mice, Artif. Cells, Nanomed. Biotechnol. 51 (2023) 180–191, https://doi.org/10.1080/21691401.2023.2197947.
[4] J. Popov, V. Caputi, N. Nandeesha, et al., Microbiota-immune interactions in ulcerative colitis and colitis associated cancer and emerging microbiota-based therapies, Int. J. Mol. Sci. 22 (2023) 11365, https://doi.org/10.3390/ijms222111365.
[5] A. Larabi, N. Barnich, H.T.T. Nguyen, New insights into the interplay between autophagy, gut microbiota and inflammatory responses in IBD, Autophagy 16 (2020) 38–51, https://doi.org/10.1080/15548627.2019.1635384.
[6] Q. He, J.D. Li, Progress in the epidemiologic study of inflammatory bowel disease, The J. Pract. Med. 35 (2019) 2962–2966.
[7] L.Y. Dai, D. Zhang, Y.Z. Qian, et al., STAT6 rs324015 gene polymorphism increases ulcerative colitis risk: a case-control study, Pharmgenomics Pers. Med. 14 (2021) 101–107, https://doi.org/10.2147/PGPM.S271327.
[8] L.F. Sifuentes-Dominguez, H.Y. Li, E. Llano, et al., SCGN deficiency results in colitis susceptibility 8 (2019) e49910, https://doi.org/10.7554/eLife.49910.
[9] L. Du, C. Ha, Epidemiology and pathogenesis of ulcerative colitis, Gastroenterol. Clin. North Am. 49 (2020) 643–654, https://doi.org/10.1016/j.gtc.2020.07.005.
[10] Y. Liu, B.G. Li, Y.H. Su, et al., Potential activity of traditional Chinese medicine against ulcerative colitis: a review, J. Ethnopharmacol. 289 (2022) 115084, https://doi.org/10.1016/j.jep.2022.115084.
[11] M. Higashiyama, A. Sugita, K. Koganei, et al., Management of elderly ulcerative colitis in Japan, J. Gastroenterol. 54 (2019) 571–586, https://doi.org/10.1007/s00535-019-01580-y.
[12] J.A. Sninsky, E.L. Barnes, X. Zhang, et al., Urgency and its association with quality of life and clinical outcomes in patients with ulcerative colitis, Am. J. Gastroenterol. 117 (2022) 769–776, https://doi.org/10.14309/ajg.0000000000001685.
[13] O. Olén, R. Erichsen, M.C. Sachs, et al., Colorectal cancer in ulcerative colitis: a Scandinavian population-based cohort study, Lancet 395M (2020) 123–131, https://doi.org/10.1016/S0140-6736(19)32545-0.
[14] E.F. Abdel Hamed, N.E. Mostafa, S.M. Farag, et al., Human protozoa infection and dysplasia in ulcerative colitis: a neglected aspect in a prominent disease, Parasitol. Res. 122 (2023) 2709–2718, https://doi.org/10.1007/s00436-023-07972-7.
[15] B. Bokemeyer, N. Picker, D. Kromer, et al., Rates of clinical remission and inadequate response to advanced therapies among patients with ulcerative colitis in Germany, Int. J. Colorectal Dis. 38 (2023) 116, https://doi.org/10.1007/s00384-023-04397-7.
[16] R.V. Yewale, B.S. Ramakrishna, B.V. Doraisamy, et al., Long-term safety and effectiveness of azathioprine in the management of inflammatory bowel disease: a real-world experience, JGH Open 7 (2023) 599–609, https://doi.org/10.1002/jgh3.12955.
[17] K. Papamichael, W. Afif, D. Drobne, et al., Therapeutic drug monitoring of biologics in inflammatory bowel disease: unmet needs and future perspectives, Lancet. Gastroenterol. Hepatol. 7 (2022) 171–185, https://doi.org/10.1016/S2468-1253(21)00223-5.
[18] S.J. Liu, H. Yuan, S.H. Zhao, Net meta-analysis of changes in intestinal flora in patients with ulcerative colitis by traditional Chinese medicine, Chin. contemporary med 30 (2023) 21–28+197.
[19] H. Liu, Z. Huang, L. Wei, et al., Uncertainty analysis and optimization for mild moxibustion, PLoS One 18 (2023) e0282355, https://doi.org/10.1371/journal.pone.0282355.
[20] X. Wang, Y. Wang, S. Wei, et al., An overview of systematic reviews of acupuncture for infertile women undergoing in vitro fertilization and embryo transfer, Front. Public Health 9 (2021) 651811, https://doi.org/10.3389/fpubh.2021.651811.
[21] Q. Qi, H. Im, K.S. Li, et al., Influence of herb-partitioned moxibustion at Qihai (CV6) and bilateral Tianshu (ST25) and Shangjuxu (ST37) acupoints on toll-like receptors 4 signaling pathways in patients with ulcerative colitis, J. Tradit. Chin. Med. 41 (2021) 479–485, https://doi.org/10.19852/j.cnki.jtcm.20210310.001.
[22] Z. Chen, J. Li, Q. Ma, et al., Anti-inflammaory effects of two-week sacral nerve stimulation therapy in patients with ulcerative colitis, Neuromodulation (23) (2023) S1094–S7159, https://doi.org/10.1016/j.neurom.2023.01.019, 00106-X.
[23] Q. Huang, L.C. Dong, R.B. Zhang, et al., Effect of electroacupuncture on Notch/NF-κB signaling pathway in colonic mucosa of mice with ulcerative colitis, Zhen Ci Yan Jiu 48 (2023) 158–164, https://doi.org/10.13702/j.1000-0607.20211284.
[24] R.B. Zhang, L.C. Dong, Y. Shen, et al., Electroacupuncture alleviates ulcerative colitis by targeting CXCL1: evidence from the transcriptome and validation, Front. Immunol. 14 (2023) 1187574, https://doi.org/10.3389/fimmu.2023.1187574.
[25] T.H. Jin, Notes on writing systematic evaluation reevaluations, Chi. Drug Evaluation. 36 (2019) 1–4. https://doi:10.3969/j.issn.2095-3593.2019.01.001.

[26] Y. Ye, A. Liu, The effectiveness of tai chi for knee osteoarthritis: an overview of systematic reviews, Int. J. Gen. Med. 16 (2023) 4499–4514, https://doi.org/10.2147/IJGM.S434800.
[27] V.K. Lavu, R.A. Mohamed, R. Huang, et al., Evaluation and treatment of depression in stroke patients: a systematic review, Cureus 14 (2022) e28137, https://doi.org/10.7759/cureus.28137.
[28] R. Inokuchi, K. Hanari, K. Shimada, et al., Barriers to and facilitators of advance care planning implementation for medical staff after the COVID-19 pandemic: an overview of reviews, BMJ Open 13 (2023) e075969, https://doi.org/10.1136/bmjopen-2023-075969.
[29] A. Shamabadi, A. Ahmadzade, K. Pirahesh, et al., Suicidality risk after using cannabis and cannabinoids: an umbrella review, Dialogues Clin. Neurosci. 25 (2023) 50–63, https://doi.org/10.1080/19585969.2023.2231466.
[30] E. Rasmussen-Barr, M. Halvorsen, T. Bohman, et al., Summarizing the effects of different exercise types in chronic neck pain-a systematic review and meta-analysis of systematic reviews, BMC Muscoskel. Disord. 24 (2023) 806, https://doi.org/10.1186/s12891-023-06930-9.
[31] X. Li, L. Liang, S. Li, et al., Effect of acupuncture in eczema: an overview of systematic reviews, Complement, Ther. Med. 73 (2023) 102925. https://doi:10.1016/j.ctim.2023.102925.
[32] M.J. Page, J.E. McKenzie, P.M. Bossuyt, et al., The PRISMA 2020 statement: an updated guideline for reporting systematic reviews, BMJ 372 (2021) n71, https://doi.org/10.1136/bmj.n71.
[33] J.A.C. Sterne, J. Savović, M.J. Page, et al., RoB 2: a revised tool for assessing risk of bias in randomised trials, BMJ 266 (2019) l4898, https://doi.org/10.1136/bmj.l4898.
[34] Y. Wu, E. Fenfen, Y. Wang, et al., Efficacy of internet-based cognitive-behavioral therapy for depression in adolescents: a systematic review and meta-analysis, Internet, Interv 34 (2023) 100673, https://doi.org/10.1016/j.invent.2023.100673.
[35] S. Šuster, T. Baldwin, J.H. Lau, et al., Automating quality assessment of medical evidence in systematic reviews: model development and validation study, J. Med. Internet Res. 25 (2023) e35568, https://doi.org/10.2196/35568.
[36] M.S. Chen, Y.X. Bao, Meta-analysis of efficacy and side effects of moxibustion in the treatment of ulcerative colitis, J. Practical. Chin. Med. Int. Med. 33 (2019) 4–7. https://doi:10.13729/j.issn.1671-7813.z20190284.
[37] D.H. Wang, Y.L. Luo, C. Li, Meta-analysis of curative effect of moxibustionon ulcerative colitis, Liaoning J. Tradit. Chin. Med. 38 (2011) 2247–2248. https://doi:10.13192/j.ljtcm.2011.11.137.wangdh.056.
[38] W.W. Zhao, B.F. Yu, Q.F. Wang, et al., Meta-analysis of clinical efficacy and adverse events of moxibustion in treatment of ulcerative colitis, Liaoning J. Tradit. Chin. Med. 38 (2011) 2247–2248.
[39] W.J. Tu, G.H. Xu, S.M. Zhang, et al., Meta-analysis and meta-regression of moxibustion therapy for ulcerative colitis, Modern salt chemical industry 44 (2017) 10–13. https://doi:10.19465/j.cnki.2095-9710.2017.06.005.
[40] T. Zhang, X.L. Su, J. Han, et al., Meta-analysis and sequential analysis of acupuncture and moxibustion in the treatment of ulcerative colitis, World J. of Int. Med. 16 (2021) 599–606. https://doi:10.13935/j.cnki.sjzx.210403.
[41] Y.Y. Wang, F.F. Li, C. Zhang, et al., A meta-analysis of the efficacy of acupuncture in the treatment of inflammatory bowel disease, Chin. Trad. Med. modern distance education 16 (2018) 128–131.
[42] D.H. Lee, J.I. Kim, M.S. Lee, et al., Moxibustion for ulcerative colitis: a systematic review and meta-analysis, BMC Gastroenterol. 10 (2010) 36, https://doi.org/10.1186/1471-230X-10-36.
[43] X. Yang, M. He, Q. Tang, et al., Assessment of anti-inflammatory efficacy of acupuncture in patients with inflammatory bowel disease: a systematic review and meta-analysis, Complement, Ther. Med. 74 (2023) 102946, https://doi.org/10.1016/j.ctim.2023.102946.
[44] X. Wang, N.Q. Zhao, Y.X. Sun, et al., Acupuncture for ulcerative colitis: a systematic review and meta-analysis of randomized clinical trials, BMC Complement, Méd. Thérapeutique 20 (2020) 309, https://doi.org/10.1186/s12906-020-03101-4.
[45] M. Chen, S. Zhao, Y. Guo, et al., The influence of acupuncture parameters on efficacy and the possible use of acupuncture in combination with or as a substitute for drug therapy in patients with ulcerative colitis, evid. Based complement, Alternat. Med. 2022 (2022) 8362892, https://doi.org/10.1155/2022/8362892.
[46] J. Zhu, L. Yang, S. Liu, Acupuncture, from the ancient to the current, Anat. Rec. 304 (2021) 2365–2371 (Hoboken). https://doi:10.1002/ar.24625.