

# Adjunctive Anweiyang capsules combined with Western medicine for peptic ulcer disease: a systematic review and meta-analysis of randomized controlled trials

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## ABSTRACT

**Introduction** Anweiyang capsules, a Chinese patent medicine, are used to reinforce qi, resolve toxic substances, and promote healing. In this study, we aimed to conduct the first meta-analysis comprehensively evaluating the clinical effectiveness and safety of Anweiyang capsules combined with Western medicine for the treatment of peptic ulcer disease (PUD). **Methods** Eight databases were systematically searched up to July 2025 and the further updated to May 1, 2026. The Cochrane risk of bias (ROB) 2.0 tool was used to assess the risk of bias in the included randomized controlled trials (RCTs), and evidence quality was evaluated using the GRADE tool. **Results** Thirty-six RCTs involving 3858 patients were included. In subgroup meta-analyses based on the background Western medicine regimen, the addition of Anweiyang capsules was associated with a higher clinical effectiveness rate compared with Western medicine alone (standard quadruple therapy: risk ratio [RR] = 1.19, 95% confidence interval [CI]: 1.13, 1.24; standard triple therapy: RR = 1.11, 95% CI: 1.06, 1.16; other regimens: RR = 1.20, 95% CI: 1.16, 1.25). Similar associations were observed for *Helicobacter pylori* eradication (quadruple: RR = 1.24, 95% CI: 1.17, 1.31; triple: RR = 1.16, 95% CI: 1.10, 1.23; and other: RR = 1.20, 95% CI: 1.13, 1.27). Owing to heterogeneity, gastrointestinal hormones, cytokines, and angiogenic markers were analyzed descriptively, demonstrating reductions in gastrin, motilin, and interleukin-6, along with increased vascular endothelial growth factor levels. Traditional Chinese medicine treatment was also associated with reductions in epigastric pain scores and peptic ulcer recurrence rates. No significant differences in adverse events were observed between the groups. However, most studies showed “some concerns” regarding risk of bias based on ROB 2.0 and low GRADE evidence quality. **Conclusion** Although this study suggests Anweiyang capsules combined with Western medicine is effective and safe for PUD, further high-quality, large-scale RCTs are warranted for confirmation.

**Registration:** The study protocol was registered with the International Prospective Register of Systematic Reviews (<https://www.crd.york.ac.uk/PROSPERO/>, CRD420251087273).

## KEYWORDS

Anweiyang capsule, peptic ulcer disease, meta-analysis, systematic review, clinical effectiveness

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## 1. Introduction

Peptic ulcers are inflammatory lesions of the gastrointestinal mucosa, primarily caused by the corrosive effects of gastric acid and digestive enzymes. This condition can extend through the mucosal muscle layer or penetrate deeper into the underlying tissues.<sup>1,2</sup> Peptic ulcers typically occur in the stomach and duodenum but can also develop near esophagogastric anastomoses, gastrojejunal anastomoses, or within Meckel's diverticulum containing the gastric mucosa.<sup>3</sup> Estimates suggest that approximately 10% of the population develops peptic ulcers at some point in their lives. Symptoms include upper abdominal pain, nausea, vomiting, and indigestion, and recurrent episodes can significantly affect the patient's daily life and work.<sup>4</sup> Therefore, effective

symptomatic treatment is essential to alleviate these symptoms and improve quality of life. Its occurrence is attributed to multifactorial etiologies, including *Helicobacter pylori* (*H. pylori*) infection, smoking, nonsteroidal anti-inflammatory drug intake, and excessive alcohol consumption. Studies have shown that *H. pylori* infection is the primary etiology of gastric ulcers (GU) and is widespread in approximately 50% of the global populace.<sup>5</sup>

Current Western medical practices primarily involve strategies that inhibit gastric acid secretion, protect gastric mucosa, and eradicate *H. pylori* to foster an optimal healing environment.<sup>6</sup> Standard treatment often includes a quadruple-drug regimen, in which esomeprazole rapidly suppresses gastric acid secretion, thereby creating a low-acidity environment that enhances antibiotic efficacy. Amoxicillin and clarithromycin are commonly used to target *H. pylori*, whereas colloidal bismuth pectin offers protective benefits to the gastrointestinal mucosa.<sup>7-9</sup> Although quadruple therapy can alleviate symptoms during the acute phase, many patients experience recurrence, prolonged ulcer healing, or emergence of chronic ulcers. Moreover, the extended use of these therapies increases the risk of adverse effects, including drug allergies and impaired liver and kidney function.

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In traditional Chinese medicine (TCM), peptic ulcers are classified under “stomachache” and “gastric hospital carbuncle.”<sup>10</sup> Factors such as improper diet, external environmental influences, and emotional stress can damage the spleen and stomach, resulting in symptoms such as qi stagnation, phlegm obstruction, abdominal distension, belching, and weakness, often accompanied by a pale, fatty tongue and a weak pulse.<sup>11,12</sup> TCM has a long-standing tradition of treating peptic ulcers through pattern differentiation and individualized therapeutic adjustments, and has accumulated valuable clinical experience over time.<sup>13</sup> Anweiyang capsules, a proprietary Chinese medicinal preparation derived from flavonoids of *Glycyrrhiza uralensis* Fisch. (*G. uralensis*, Gan Cao), are known for their consolidating effects. Anweiyang capsules effectively inhibit gastric acid production, regulate metabolic functions, and minimize adverse reactions.<sup>14,15</sup> Recently, a combination of traditional Chinese and Western medicines has yielded promising results in the treatment of peptic ulcers.<sup>16</sup> However, further studies are needed to draw more rigorous conclusions. To the best of our knowledge, this is the first study to systematically evaluate the clinical effectiveness and safety of Anweiyang capsules in the treatment of peptic ulcer disease (PUD) using meta-analysis. Our objective was to provide preliminary evidence for the safety and clinical effectiveness of Anweiyang capsules in treating PUD. By employing this meta-analytical approach, we aimed to provide essential insights for clinicians, which may assist them in devising the most effective treatment plans for patients with PUD.

## 2. Methods

This meta-analysis was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines,<sup>17,18</sup> and the Cochrane Handbook for Systematic Reviews of Interventions.<sup>18,19</sup>

### 2.1. Eligibility criteria

- (I) Study type: Randomized controlled trials (RCTs).
- (II) Participants: All participants had a clear diagnosis of PUD, irrespective of age, sex, race, or disease duration.
- (III) Intervention measures: The intervention group received Anweiyang capsules in combination with Western medications. The control group received either (a) Western medication alone, including standard quadruple therapy (proton pump inhibitor + amoxicillin + clarithromycin + bismuth agent), standard triple therapy (proton pump inhibitor + amoxicillin + clarithromycin), or other combination regimens (e.g., non-standard triple/quadruple therapy, dual therapy, or monotherapy), or (b) placebo plus Western medication (such as the same Western medications as used in the intervention group). Trials using TCM therapies (such as acupuncture, massage, or herbal medicine) as control interventions were excluded.
- (IV) Results: Primary outcomes included clinical effectiveness and *H. pylori* eradication rates. Secondary outcomes included gastrointestinal hormone levels, inflammatory and healing factors, TCM syndrome score for epigastric pain, recurrence rate, and adverse events.
- (V) Criteria for clinical effectiveness: All included studies defined clinical effectiveness using a combination of endoscopic ulcer healing and symptom resolution. Although the exact wording varied slightly across studies, the following core framework was consistently applied: A clinical cure was defined as complete ulcer healing (either scar formation or no visible trace) accompanied by the full resolution of all associated symptoms. Marked effectiveness was considered when the ulcer reached the healing stage, with the disappearance of key symptoms such as epigastric pain and acid reflux. Effectiveness was recorded if the ulcer showed signs of healing along with symptomatic relief, whereas ineffectiveness indicated no improvement in either ulcer status or symptoms. The clinical effectiveness rate was determined as the sum of the number of people who showed clinical cure, significant effects, and those who were effectively treated, divided by the total number of people.<sup>20,21</sup>

### 2.2. Search strategy

A comprehensive literature search was conducted across multiple databases,

including PubMed, Embase, SinoMed, Web of Science, the Cochrane Library, China National Knowledge Infrastructure, Wanfang, and Chinese Scientific Journals Database (VIP). Studies published in Chinese and English were searched from database inception to the initial search date in July 2025. An updated literature search was subsequently conducted on May 1, 2026, covering the period from the initial search to that date. Our search strategy incorporated both Medical Subject Headings (MeSH) and free-text words. A detailed search strategy for each database is provided in Appendix 1.

### 2.3. Research selection

Two reviewers (HSZ and ZJB) independently read the titles, abstracts, and full texts to identify appropriate studies and extract data from eligible studies. In cases of disagreement during data extraction, a third reviewer (HLL) was consulted to resolve discrepancies and achieve consensus. The data extraction criteria included the first author, publication date, sample size (including the total number of participants in each intervention and control group, along with sex distribution), average age, treatments in the intervention and control groups, treatment duration, clinical effectiveness, adverse events, other outcome measures, funding sources, and any declared conflicts of interest for each included study.

### 2.4. Risk of bias (ROB) in individual studies

Two reviewers (HSZ and ZJB) evaluated the risk of bias in the included studies using the Cochrane Bias Risk Tool. After the evaluation, any disagreements were resolved through consultation with a third reviewer (HLL), and the final bias assessment was determined jointly. The ROB for each study was determined using the Cochrane Collaboration's ROB Tool 2.0.<sup>19</sup> Various factors affecting study quality, such as the randomization process, deviations from intended interventions, missing outcome data, outcome measurement, and selection of reported results, were carefully examined. These factors were categorized as having a low ROB, high ROB, or some concerns.

### 2.5. Statistical analysis

Stata software (version 17.0; StataCorp.LLC, College Station, TX) and a random-effects model for data merging were used. Continuous data were analyzed using the standardized mean difference (SMD) and 95% confidence interval (CI),<sup>22</sup> while categorical data were assessed using the risk ratio (RR) and 95% CI. Our analysis included subgroup analyses, sensitivity analyses, and the detection of publication bias using Egger's test. To determine the incidence rate of adverse events, MATLAB software (version R2025a; The MathWorks, Inc., Natick, Massachusetts) was used to generate three-dimensional maps for enhanced data visualization.

### 2.6. Assessment of evidence quality

Two reviewers (HSZ and ZJB) independently assessed the certainty of the evidence for each outcome using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) pro Guideline Development Tool (GRADEpro GDT; <https://www.grade-pro.org>, accessed July 21, 2025). During the assessment process, any discrepancies were resolved through discussion or consultation with a third reviewer (HLL), if necessary.

## 3. Results

### 3.1. Database search

A total of 199 studies were retrieved from the eight databases. After re-examination, 102 studies were identified as duplicates using EndNote (Version X9; Clarivate Analytics, Philadelphia, PA). Following preliminary screening of the remaining 97 studies, 51 were excluded because they did not meet the inclusion criteria. Subsequently, full-text screening was performed for the remaining 46 studies, of which 36 RCTs met the inclusion criteria. An updated search conducted on May 1, 2026, retrieved no additional eligible RCTs. A flowchart illustrating the study screening and selection process is shown in Figure 1.

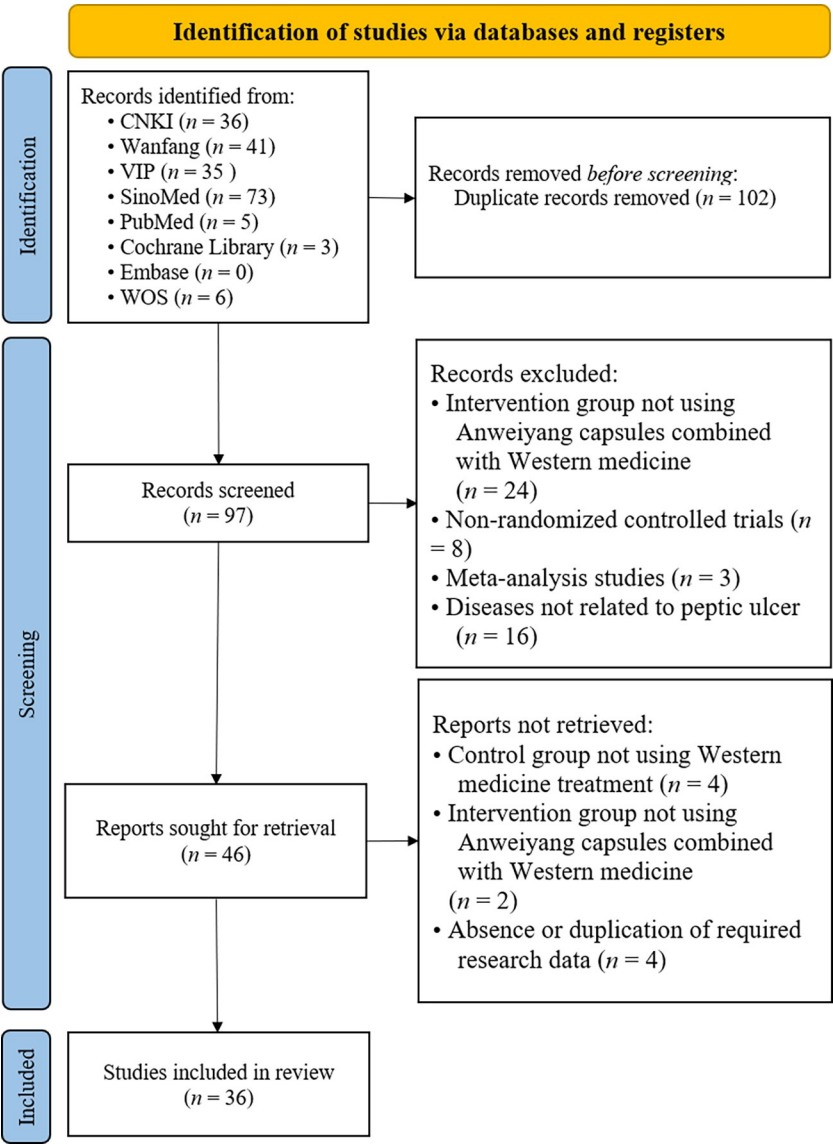


**Figure 1 PRISMA flowchart of study selection**

**Notes:** CNKI: China National Knowledge Infrastructure; PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses; VIP: Chinese Scientific Journals Database; WOS: Web of Science database.

3.2. Study characteristics

A total of 36 studies<sup>20,23-57</sup> published between 2011 and 2025 were included in our meta-analysis, comprising 3858 patients with PUD. This included 1930 patients in the control group and 1928 patients in the intervention group. In all 36 studies, the intervention groups received Anweiyang capsules in combination with the treatments administered to the control groups. In the control groups, 12 studies used standard quadruple therapy, eight studies used standard triple therapy, and 16 studies used other combination regimens. The specific medications used in the control group are listed in Table 1.

Among the 36 included studies, only one study<sup>23</sup> explicitly reported its funding source (Hebei Qinhuangdao Science and Technology Research and Development Program Project, no.: 201902A160), and the remaining 35 studies did not report funding information. Regarding conflicts of interest, two studies<sup>24,25</sup> stated that the authors had no conflicts of interest, whereas the other 34 studies provided no relevant declarations.

3.3. ROB analysis

We assessed the ROB of 36 studies, and the results showed that eight stud-

ies<sup>23,32,34,38,50,55-57</sup> were classified as high risk, whereas 28<sup>20,24-31,33,35-37,39-49,51-54</sup> were classified as having some concerns. In the randomization process, 12 studies<sup>20,24,25,28-30,33,37,41,42,47,51</sup> that employed a randomized table of numbers method for patient assignment were rated as low-risk, while the other three studies<sup>32,38,50</sup> that assigned patients based on the order of arrival were rated as high-risk. The remaining studies<sup>23,26,27,31,34-36,39,40,43-46,48,49,52-57</sup> in this field were evaluated as having some concerns. When evaluating deviations from intended interventions, none of the studies explicitly mentioned the use of blinding or placebos. Among them, four studies<sup>23,55-57</sup> did not clearly state their statistical analysis methods. Therefore, these four studies were assessed as high risk, whereas the remaining 32 studies were rated as having “some concerns”. In the fields of missing outcome data and partial outcome reporting, all studies provided comprehensive data on multiple outcome indicators and were therefore rated as low risk. In the field of reported results, several outcome measures mentioned in the Methods section of one study<sup>34</sup> were not reported in the results section, resulting in a high-risk rating. Furthermore, the studies were unregistered, making it impossible to assess the consistency between their actual results and previous planning. Consequently, they were rated as having some concerns (Appendix 2).

**Table 1 Basic characteristics of the included studies**

| Study ID               | Sex<br>(M/F) | Sample<br>(C/T) | Average age (y) <sup>†</sup> |               | Intervention                                                            |                                                                                             | Course<br>(day) | Outcomes |
|------------------------|--------------|-----------------|------------------------------|---------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------|----------|
|                        |              |                 | C                            | T             | C                                                                       | T                                                                                           |                 |          |
| Zhang LH <sup>20</sup> | NR           | 20/20           | 34.00 (5.10)                 | 43.20 (4.40)  | Pantoprazole + amoxicillin + clarithromycin                             | Pantoprazole + amoxicillin + clarithromycin + Anweiyang capsule                             | 56              | ①⑧       |
| Zhang YQ <sup>23</sup> | 52/40        | 46/46           | 52.15 (6.31)                 | 51.84 (6.41)  | Rabeprazole                                                             | Rabeprazole + Anweiyang capsule                                                             | 28              | ①②⑤      |
| Zhao YP <sup>24</sup>  | 95/71        | 83/83           | 48.62 (10.19)                | 50.11 (9.97)  | Sucralfate                                                              | Sucralfate + Anweiyang capsule                                                              | 42              | ①②③⑦⑧⑨   |
| Huang D <sup>25</sup>  | 60/42        | 51/51           | 47.27 (5.34)                 | 47.69 (3.38)  | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin  | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin + Anweiyang capsule  | 56              | ①②③④⑥⑧⑨  |
| Zhu CY <sup>26</sup>   | 78/22        | 50/50           | 60.55 (5.36)                 | 60.37 (5.20)  | Sucralfate                                                              | Sucralfate + Anweiyang capsule                                                              | NR              | ③⑦       |
| Li Z P <sup>27</sup>   | 59/45        | 52/52           | 48.31 (9.62)                 | 47.65 (9.18)  | Omeprazole + amoxicillin + metronidazole + colloidal bismuth pectin     | Omeprazole + amoxicillin + metronidazole + colloidal bismuth pectin + Anweiyang capsule     | 14              | ①②       |
| Bai F <sup>28</sup>    | 45/41        | 43/43           | 43.90 (3.82)                 | 44.20 (3.78)  | Omeprazole + amoxicillin + clarithromycin + teprenone                   | Omeprazole + amoxicillin + clarithromycin + teprenone + Anweiyang capsule                   | 28              | ①②③④⑤⑨   |
| Chen D <sup>29</sup>   | 50/30        | 40/40           | 36.72 (2.43)                 | 37.07 (2.13)  | Rabeprazole + amoxicillin + clarithromycin                              | Rabeprazole + amoxicillin + clarithromycin + Anweiyang capsule                              | 28              | ③④⑨      |
| Zhang CG <sup>30</sup> | 47/44        | 46/45           | 45.16 (2.78)                 | 43.12 (2.31)  | Omeprazole + clarithromycin + furazolidone + bismuth potassium citrate  | Omeprazole + clarithromycin + furazolidone + bismuth potassium citrate + Anweiyang capsule  | 28              | ①③⑧      |
| Zeng LJ <sup>31</sup>  | 34/36        | 35/35           | 48.35 (5.62)                 | 48.44 (5.73)  | Esomeprazole                                                            | Esomeprazole + Anweiyang capsule                                                            | 21              | ①        |
| Zhang CY <sup>32</sup> | 46/38        | 42/42           | 48.93 (9.97)                 | 48.46 (10.58) | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin  | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin + Anweiyang capsule  | 28              | ①②⑨      |
| Wang WF <sup>33</sup>  | 46/36        | 41/41           | 46.38 (9.20)                 | 45.31 (8.42)  | Rabeprazole + amoxicillin + clarithromycin + bismuth potassium citrate  | Rabeprazole + amoxicillin + clarithromycin + bismuth potassium citrate + Anweiyang capsule  | 28              | ①②⑦      |
| Cao Y <sup>34</sup>    | 48/40        | 44/44           | 45.27 (3.18)                 | 45.34 (3.26)  | Teprenone                                                               | Teprenone + Anweiyang capsule                                                               | 30              | ①②       |
| Gao M <sup>35</sup>    | 42/38        | 40/40           | 45.00 (20.10)                | 45.10 (20.20) | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin  | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin + Anweiyang capsule  | 28              | ①②       |
| Zhang LJ <sup>36</sup> | 103/45       | 74/74           | 50.80 (8.90)                 | 51.40 (6.30)  | Esomeprazole + amoxicillin + furazolidone + compound bismuth aluminate  | Esomeprazole + amoxicillin + furazolidone + compound bismuth aluminate + Anweiyang capsule  | 42              | ①②③      |
| Li HQ <sup>37</sup>    | 51/47        | 49/49           | 41.53 (5.07)                 | 42.23 (5.84)  | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin  | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin + Anweiyang capsule  | 28              | ①⑨       |
| Zhang HF <sup>38</sup> | 54/48        | 51/51           | 46.04 (2.12)                 | 46.45 (2.57)  | Teprenone                                                               | Teprenone + Anweiyang capsule                                                               | 28              | ①②③④⑥⑦⑨  |
| Wang XL <sup>39</sup>  | 41/34        | 38/37           | 40.64 (4.48)                 | 40.23 (6.79)  | Rabeprazole + amoxicillin + clarithromycin + bismuth potassium citrate  | Rabeprazole + amoxicillin + clarithromycin + bismuth potassium citrate + Anweiyang capsule  | 30              | ②⑦       |
| He F <sup>40</sup>     | 96/92        | 94/94           | NR                           | NR            | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin  | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin + Anweiyang capsule  | 28              | ①②⑤⑥     |
| Li LL <sup>41</sup>    | 44/40        | 42/42           | 46.16 (8.57)                 | 45.39 (9.23)  | Rabeprazole + amoxicillin + clarithromycin + bismuth potassium citrate  | Rabeprazole + amoxicillin + clarithromycin + bismuth potassium citrate + Anweiyang capsule  | 28              | ①②⑤⑥⑨    |
| Chen F <sup>42</sup>   | 57/41        | 49/49           | 58.19 (4.27)                 | 59.05 (4.11)  | Omeprazole                                                              | Omeprazole + Anweiyang capsule                                                              | 90              | ①③       |
| Yang J <sup>43</sup>   | 69/31        | 50/50           | 52.80 (6.25)                 | 52.97 (6.30)  | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin  | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin + Anweiyang capsule  | 28              | ①②⑦⑨     |
| Hu CY <sup>44</sup>    | 52/34        | 43/43           | 40.13 (6.25)                 | 39.72 (5.43)  | Lansoprazole + amoxicillin + clarithromycin + bismuth potassium citrate | Lansoprazole + amoxicillin + clarithromycin + bismuth potassium citrate + Anweiyang capsule | 28              | ①②⑤⑥⑦⑨   |
| Zhao YD <sup>45</sup>  | 56/42        | 49/49           | 45.20 (7.20)                 | 45.20 (7.20)  | Rabeprazole + amoxicillin + clarithromycin                              | Rabeprazole + amoxicillin + clarithromycin + Anweiyang capsule                              | 56              | ①②③④⑨    |

(To be continued on the next page)

(Continued)

| Study ID               | Sex<br>(M/F) | Sample<br>(C/T) | Average age (y) <sup>†</sup> |               | Intervention                                                                                                                        |                                                                                                                                                                             | Course<br>(day) | Outcomes |
|------------------------|--------------|-----------------|------------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------|
|                        |              |                 | C                            | T             | C                                                                                                                                   | T                                                                                                                                                                           |                 |          |
| Wang W <sup>46</sup>   | 288/192      | 240/240         | 35.10                        | 36.00         | Proton pump inhibitor + antibiotics + bismuth agen (drug names not reported)                                                        | Proton pump inhibitor + antibiotics + bismuth agent (drug names not reported) + Anweiyang capsule                                                                           | 28              | ①⑨       |
| Zhang KS <sup>47</sup> | NR           | 25/25           | 41.20 (4.20)                 | 43.10 (4.30)  | Rabeprazole + amoxicillin + clarithromycin + bismuth potassium citrate                                                              | Rabeprazole + amoxicillin + clarithromycin + bismuth potassium citrate + Anweiyang capsule                                                                                  | 14              | ①②       |
| Zhou E <sup>48</sup>   | 48/46        | 47/47           | 45.69 (3.27)                 | 45.63 (3.25)  | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin                                                              | Esomeprazole + amoxicillin + clarithromycin + colloidal bismuth pectin + Anweiyang capsule                                                                                  | 28              | ①②⑤⑥⑨    |
| Yang ZL <sup>49</sup>  | 70/50        | 60/60           | 45.50 (6.30)                 | 45.80 (6.50)  | Rabeprazole + amoxicillin + clarithromycin                                                                                          | Rabeprazole + amoxicillin + clarithromycin + Anweiyang capsule                                                                                                              | 56              | ①②③④⑧⑨   |
| Wu ZY <sup>50</sup>    | 33/39        | 36/36           | 43.22 (5.14)                 | 42.54 (5.07)  | Hp (+): Pantoprazole + amoxicillin + clarithromycin + bismuth potassium citrate<br>Hp (-): Pantoprazole + bismuth potassium citrate | Hp (+): Pantoprazole + amoxicillin + clarithromycin + bismuth potassium citrate + Anweiyang capsule<br>Hp (-): Pantoprazole + bismuth potassium citrate + Anweiyang capsule | 42              | ①②⑧      |
| Li Z <sup>51</sup>     | 56/64        | 60/60           | 43.20 (11.60)                | 45.50 (12.30) | Ilaprazole + amoxicillin + clarithromycin                                                                                           | Ilaprazole + amoxicillin + clarithromycin + Anweiyang capsule                                                                                                               | 35              | ①        |
| Li DW <sup>52</sup>    | 58/18        | 38/38           | 41.70                        | 42.50         | Pantoprazole + amoxicillin + clarithromycin                                                                                         | Pantoprazole + amoxicillin + clarithromycin + Anweiyang capsule                                                                                                             | 28              | ①②⑧⑨     |
| Li DY <sup>53</sup>    | 38/22        | 30/30           | 43.20 (1.80)                 | 41.40 (2.10)  | Ranitidine + sucralfate                                                                                                             | Ranitidine + sucralfate + Anweiyang capsule                                                                                                                                 | 56              | ①⑨       |
| WRLQ <sup>54</sup>     | 49/41        | 45/45           | 47.00                        | 45.00         | Omeprazole + amoxicillin + clarithromycin                                                                                           | Omeprazole + amoxicillin + clarithromycin + Anweiyang capsule                                                                                                               | 10              | ①②       |
| Li FX <sup>55</sup>    | 115/35       | 75/75           | 47.00                        | 45.50         | Omeprazole + amoxicillin + clarithromycin                                                                                           | Omeprazole + amoxicillin + clarithromycin + Anweiyang capsule                                                                                                               | 10              | ①②⑨      |
| Liu XD <sup>56</sup>   | 56/28        | 42/42           | NR                           | NR            | Rabeprazole + amoxicillin                                                                                                           | Rabeprazole + amoxicillin + Anweiyang capsule                                                                                                                               | 28              | ①⑧       |
| Cheng B <sup>57</sup>  | 67/53        | 60/60           | 32.00                        | 34.00         | Hp (+): Lansoprazole + amoxicillin + clarithromycin + colloidal bismuth pectin<br>Hp (-): Lansoprazole + bismuth potassium citrate  | Hp (+): Lansoprazole + amoxicillin + clarithromycin + colloidal bismuth pectin + Anweiyang capsule<br>Hp (-): Lansoprazole + bismuth potassium citrate + Anweiyang capsule  | 28              | ①⑨       |

**Notes:** C: control group; F: female; Hp: *Helicobacter pylori*; M: male; NR: not reported; T: treatment group; y: year. <sup>†</sup> Data are presented as mean (standard deviation), or individual value as indicated. ① clinical effectiveness; ② Hp eradication rate; ③ gastrin; ④ motilin; ⑤ interleukin-6; ⑥ vascular endothelial growth factor; ⑦ traditional Chinese medicine syndrome scores for epigastric pain; ⑧ peptic ulcer disease recurrence rate; ⑨ adverse events.

### 3.4. Meta-analysis

#### 3.4.1. Clinical effectiveness

Among the 36 included studies, 33<sup>20,23-25,27,28,30-38,40-57</sup> used clinical effectiveness as an outcome measure. Because of substantial heterogeneity in the Western medicine regimens used across studies, subgroup meta-analyses were performed according to the category of Western medicine used in the control group. A fixed-effects model was applied because within-subgroup heterogeneity was low across all analyses (all  $I^2 \leq 22.1\%$ ). Compared with standard quadruple therapy alone, the addition of Anweiyang capsule was associated with improved clinical effectiveness (11 studies,<sup>25,32,33,35,37,40,41,43,44,47,48</sup> RR = 1.19, 95% CI: 1.13, 1.24), and a similar association was observed when it was added to standard triple therapy (7 studies,<sup>20,45,49,51,52,54,55</sup> RR = 1.11, 95% CI: 1.06, 1.16). In the remaining 15 studies,<sup>23,24,27,28,30,31,34,36,38,42,46,50,53,56,57</sup> which employed other regimens including dual therapy, monotherapy, and non-

standard combinations, the pooled result also favored the Anweiyang capsule combination (RR = 1.20, 95% CI: 1.16, 1.25). Forest plots of these subgroup meta-analyses are shown in Figure 2.

#### 3.4.2. *H. pylori* eradication rate

Of the included studies, 24<sup>23-25,27,28,32-36,38-41,43-45,47-49,50,52,54,55</sup> reported *H. pylori* eradication rates. Because the control groups employed different categories of Western medicine regimens, we performed subgroup meta-analyses according to the type of Western medicine administered and, given the low within-subgroup heterogeneity (all  $I^2 = 0\%$ ), applied fixed-effects models. The Anweiyang capsule combination was associated with a higher eradication rate compared with standard quadruple therapy alone (11 studies,<sup>25,32,33,35,39-41,43,44,47,48</sup>, RR = 1.24, 95% CI: 1.17, 1.31), and a similar association was observed when compared with standard triple therapy (5 studies<sup>45,49,52,54,55</sup>, RR = 1.16, 95% CI: 1.10, 1.23). In the remaining eight studies,<sup>23,24,27,28,34,36,38,50</sup> which employed other regimens including dual therapy, monotherapy, and non-standard combina-

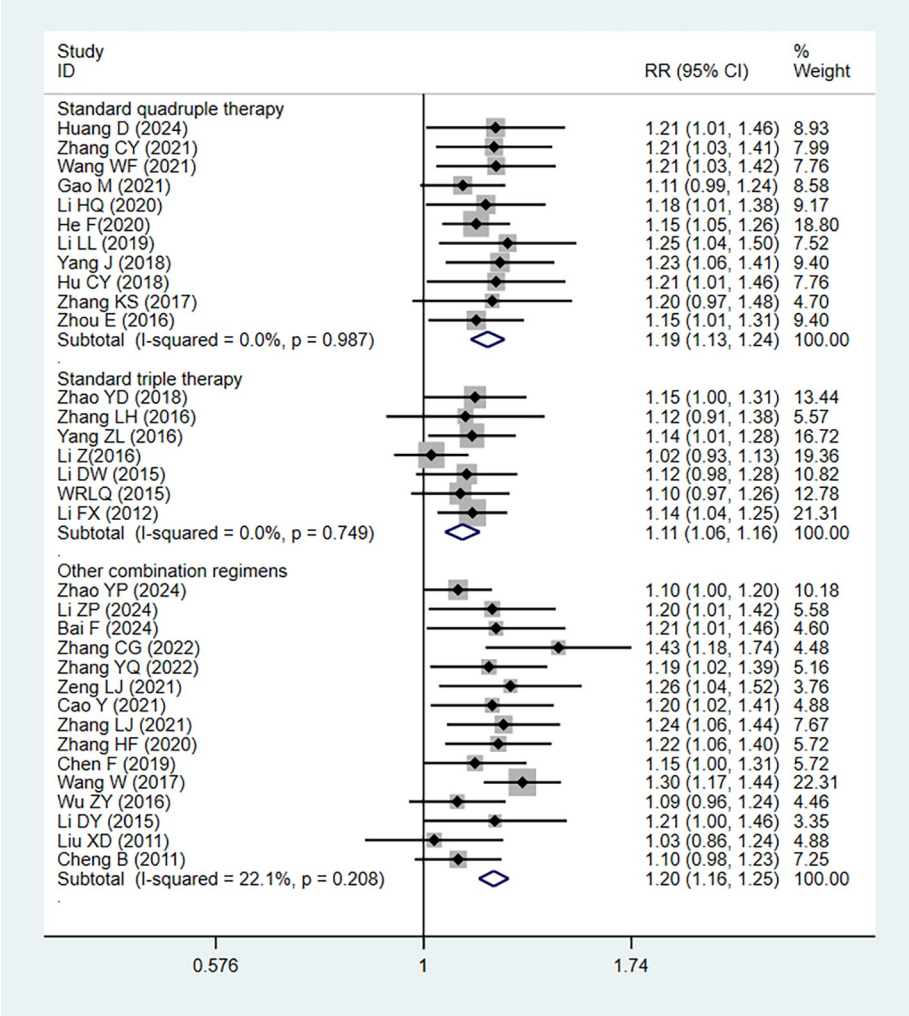


**Figure 2 Forest plot of subgroup meta-analyses for clinical effectiveness, grouped by categories of Western medicine regimens**

Notes: CI: confidence interval; RR: risk ratio.

tions, the pooled result also favored the Anweiyang capsule combination (RR = 1.20, 95% CI: 1.13, 1.27). Forest plots of these subgroup meta-analyses are shown in Figure 3.

3.4.3. Gastrointestinal hormone levels

We did not perform a meta-analysis of gastrin or motilin because of substantial heterogeneity in the measurement methods, reporting units, and background Western medicines. Instead, we provided a descriptive summary stratified according to the type of Western medicine used in the control group.

Eleven studies<sup>24-26,28-30,36,38,42,45,49</sup> reported gastrin levels. In the two studies<sup>25,36</sup> using standard quadruple therapy, the Anweiyang capsule combination group showed a greater reduction (SMD range: -1.85 to -0.86) than the control group. Among the three studies<sup>24,29,49</sup> with standard triple therapy, all favored the intervention group (SMD from -1.09 to -0.27). In the six studies<sup>26,28,30,38,42,45</sup> using other therapies, SMDs were consistently negative (from -3.15 to -0.82).

Six studies reported motilin. Only one study<sup>25</sup> used standard quadruple therapy, with an SMD of -0.99 (95% CI: -1.41, -0.58). Among the three studies<sup>29,45,49</sup> using standard triple therapy, SMDs range from -1.57 to -0.76. The two studies<sup>28,38</sup> categorized as other therapies reported SMDs of -2.64 and -3.43, respectively.

Across all studies, the Anweiyang combination consistently showed beneficial effects, though magnitudes varied; only one gastrin study<sup>29</sup> showed no

significant difference. Given the high heterogeneity and exploratory nature of these secondary outcomes, findings should be interpreted as hypothesis-generating rather than confirmatory. Detailed individual study results are presented in Figure 4.

3.4.4. Inflammatory cytokine levels

We did not perform a meta-analysis for vascular endothelial growth factor (VEGF) or interleukin-6 (IL-6) due to heterogeneity in measurement methods, reporting units, and background Western medicines. A descriptive summary stratified according to the control regimen is provided below.

Six studies<sup>25,38,40,41,44,48</sup> reported VEGF levels. Among the five studies<sup>25,40,41,44,48</sup> using standard quadruple therapy, four showed consistently higher VEGF levels in the Anweiyang capsule combination group (SMD range: 0.64 to 1.49). One study<sup>40</sup> with a quadruple regimen gave an SMD of -0.30 (95% CI: -0.70, 0.10), indicating no statistically significant difference between the groups. The single study<sup>38</sup> under “other combination regimens” also favored the intervention group (SMD = 2.29; 95% CI: 1.79, 2.80).

Six studies<sup>23,28,40,41,44,48</sup> reported IL-6. Among the four studies<sup>40,41,44,48</sup> using standard quadruple therapy, all showed greater IL-6 reduction with the intervention (SMD range: -1.17 to -0.75). The remaining two studies,<sup>23,28</sup> both of “other combination regimens” studies also favored the intervention (SMDs: -1.81 and -0.60).

Overall, the available evidence suggested that the Anweiyang capsule combination was associated with increased VEGF and reduced IL-6 levels. How-

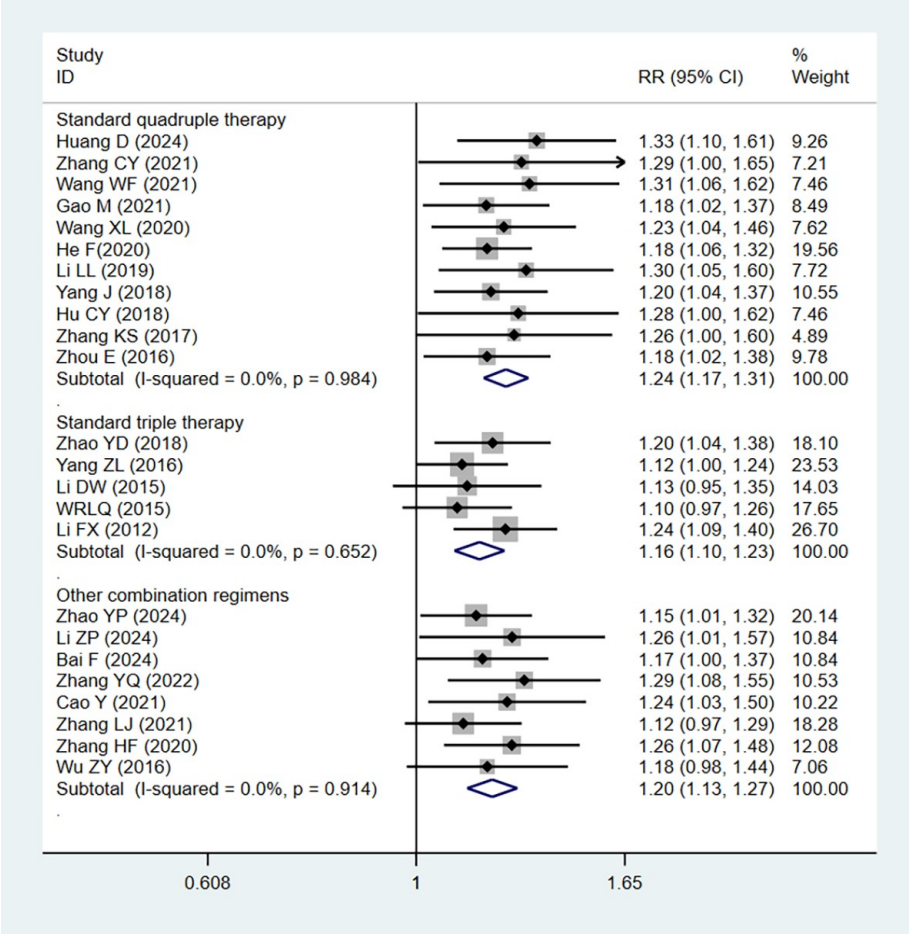


Figure 3 Forest plot of subgroup meta-analyses for clinical effectiveness, grouped by categories of Western medicine regimens

Notes: CI: confidence interval; RR: risk ratio.

ever, the magnitude of the observed effects varied considerably, and one study<sup>40</sup> on VEGF did not reach statistical significance. Given the high heterogeneity and exploratory nature of these secondary outcomes, these findings should be interpreted cautiously and considered hypothesis-generating rather than confirmatory. Detailed individual results are presented in Figure 5.

3.4.5. TCM syndrome scores for epigastric pain

Seven studies<sup>24,26,33,38,39,43,44</sup> reported changes in TCM syndrome scores from baseline. When stratified by background Western medication regimen, all studies consistently favored the Anweiyang capsule combination therapy over controls.

Among the four studies<sup>33,39,43,44</sup> using standard quadruple therapy, the SMDs for reduction in TCM syndrome scores ranged from -1.02 to -0.58. Among the three studies<sup>24,26,38</sup> using other combination regimens, the SMDs ranged from -5.90 to -0.62, also demonstrating statistically significant reductions in the intervention group.

Across all included studies, the Anweiyang capsule combination group showed a significantly greater reduction in TCM syndrome scores than the control group. The effect magnitude varied considerably, with a notably large effect observed in the study by Zhang et al.<sup>38</sup> Given the limited number of studies per subgroup, these findings should be interpreted cautiously. Detailed individual results are presented in Figure 6.

3.4.6. PUD recurrence rate

Eight studies<sup>20,25,30,45,49,50,53,56</sup> reported recurrence rates during follow-up. Follow-up durations varied across studies: one study<sup>30</sup> reported a 3-month follow-up period, one study<sup>53</sup> reported a follow-up duration of 6 to 12 months, one

study<sup>56</sup> reported a 1-year follow-up period, and the remaining five studies<sup>20,25,45,49,50</sup> reported follow-up durations of 6 months. Grouped by control regimen, the two studies<sup>25,50</sup> using standard quadruple therapy favored the intervention (RR = 0.43, 95% CI: 0.18, 1.03 and RR = 0.40, 95% CI: 0.08, 1.93). Standard triple therapy (n = 3)<sup>45,50,49</sup> also favored the intervention (RRs: 0.30, 0.38, and 0.30). Other regimens<sup>30,53,56</sup> showed RRs from 0.11 to 0.20; only one study<sup>30</sup> reached significance (RR = 0.11, 95% CI: 0.01 to 0.86). Overall, all eight studies reported a lower recurrence rate with the Anweiyang capsules. Given the limited number of studies per subgroup, these findings should be interpreted cautiously. Detailed results are presented in Figure 7.

3.4.7. Adverse events

Eighteen studies<sup>24,25,28,29,32,37,38,41,43-46,48,49,52,53,55,57</sup> explicitly reported adverse events in both the intervention and control groups, including symptoms such as nausea/vomiting, abdominal pain/diarrhea, constipation, dry mouth, rash/itchiness, headache, dizziness, insomnia, and loss of appetite. No statistical heterogeneity was observed in any subgroup analyses (Figure 8). In the standard quadruple therapy subgroup, there was no significant difference in the risk of adverse events between the Anweiyang capsule combination and the control groups (RR = 0.78, 95% CI: 0.48, 1.28). Similarly, no significant difference was observed in the standard triple therapy subgroup (RR = 0.84, 95% CI: 0.52, 1.37) or the other combination regimens subgroup (RR = 1.62, 95% CI: 0.62, 4.19). These results indicate that the addition of Anweiyang capsules did not significantly affect the incidence of adverse events, irrespective of the control group regimen. A three-dimensional guide diagram (Figure 9) was used to illustrate the incidence of adverse events across the 18 studies.

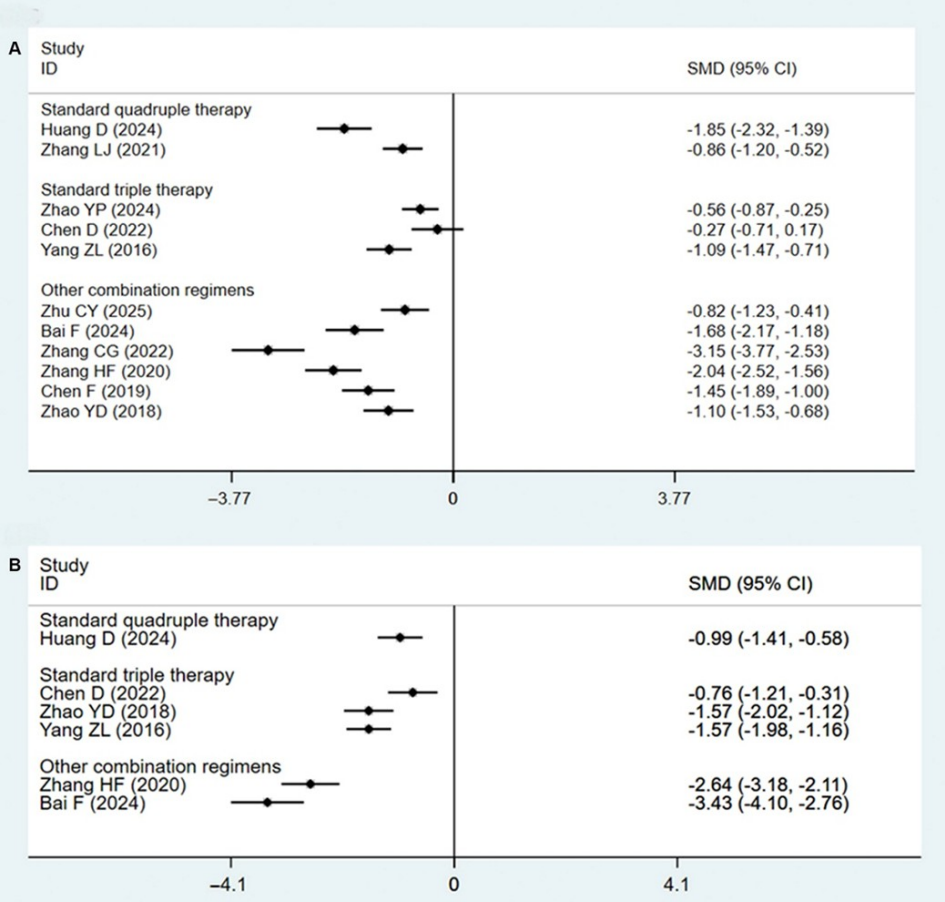


**Figure 4 Forest plot of subgroup meta-analyses for (A) gastrin and (B) motilin, grouped by categories of Western medicine regimens**  
Notes: CI: confidence interval; SMD: standardized mean difference.

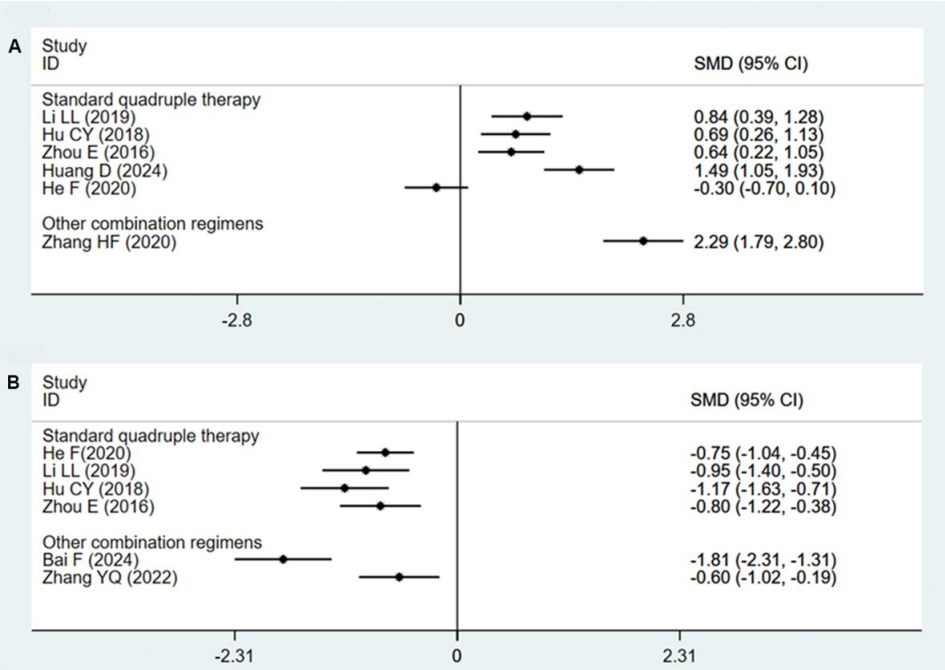


**Figure 5 Forest plot of subgroup meta-analyses for (A) VEGF and (B) IL-6, grouped by categories of Western medicine regimens**  
Notes: CI: confidence interval; IL-6: interleukin-6; SMD: standardized mean difference; VEGF: vascular endothelial growth factor.

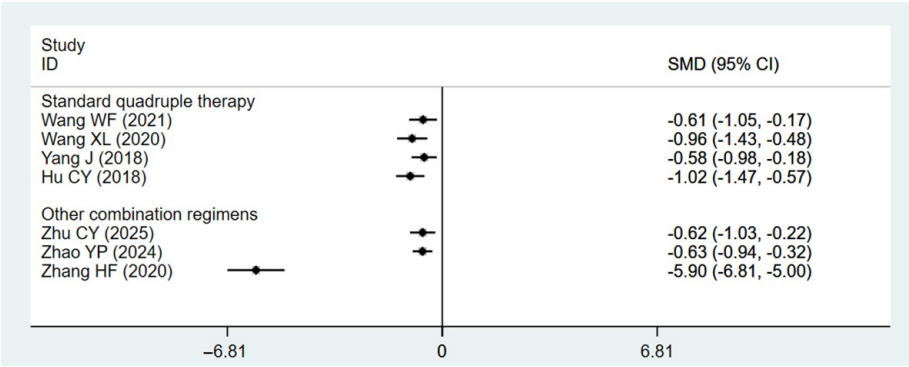


**Figure 6** Forest plot of subgroup meta-analyses for TCM syndrome scores for epigastric pain, grouped by categories of Western medicine regimens

Notes: CI: confidence interval; SMD: standardized mean difference; TCM: traditional Chinese medicine.

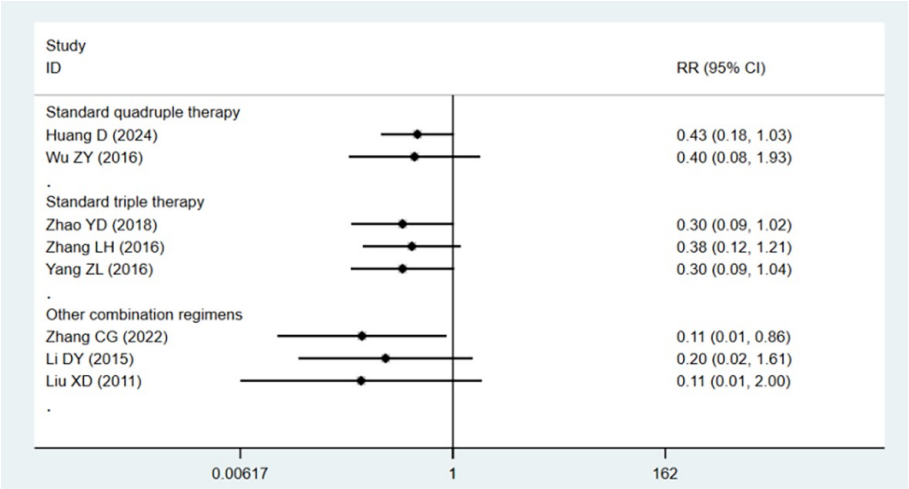


**Figure 7** Forest plot of subgroup meta-analyses for PUD recurrence rate, grouped by categories of Western medicine regimens

Notes: CI: confidence interval; PUD: peptic ulcer disease; RR: risk ratio.

3.5. Sensitivity analysis and publication bias assessment

The meta-analysis of clinical effectiveness using a fixed-effects model showed low heterogeneity ( $P = 0.78$ ,  $I^2 = 0\%$ ). However, sensitivity analysis (Figure 10) and publication bias detection (Figure 11) identified two studies,<sup>30,51</sup> which contributed substantially to the heterogeneity. The Egger’s test produced significant results ( $P = 0.01$ ), leading to the exclusion of these two studies. Subsequently, a symmetrical funnel plot and an insignificant Egger’s test result ( $P = 0.077$ ) were obtained. Regarding *H. pylori* eradication rates, the meta-analysis showed low heterogeneity ( $P = 0.989$ ,  $I^2 = 0\%$ ), although Egger’s test indicated potential publication bias ( $P = 0.001$ ). After excluding small-sample studies with a sample size of less than 50, there were symmetrical funnel plots and an insignificant Egger’s test ( $P = 0.075$ ).

3.6. GRADE evidence evaluation

Each meta-analysis result was subjected to a meticulous evaluation of the GRADE evidence (Figure 12). Outcomes for clinical effectiveness, *H. pylori* eradication rate, IL-6 levels, and PUD recurrence rate were classified as low evidence. Meanwhile, gastrin, VEGF, and motilin levels, and the TCM syndrome score for epigastric pain were evaluated as having very low evidence.

4. Discussion

4.1. Summary of evidence

PUD is a common digestive disease that leads to an imbalance in the

digestive defense and repair function of the gastrointestinal tract, and is characterized by the secretion of inflammatory factors, neutrophil infiltration, and oxidative stress. Data from 36 trials, including 3858 patients with PUD, were included in our meta-analysis. The pooled results suggest that the combination of Anweiyang capsules and Western medicine treatment for PUD had more beneficial effects than Western medicine alone. *H. pylori* infection is a primary etiological factor for gastritis, PUD, and gastric cancer, making its eradication essential for ulcer healing and preventing recurrence. The present meta-analysis indicates that combining Anweiyang capsules with conventional Western medicine achieves a higher *H. pylori* eradication rate than Western medicine alone. Gastrointestinal hormones are bioactive substances secreted by enteroendocrine cells that regulate digestive function, appetite, and metabolism. These hormones are involved in the pathogenesis of PUD and play a central role in *H. pylori*-associated duodenal ulcers and gastric cancer by stimulating acid secretion and maintaining mucosal homeostasis.<sup>58,59</sup> Our research found that the combination of Anweiyang capsules and Western medicine alleviated gastric tissue damage, reduced the production of inflammatory mediators, and lowered the levels of gastrin, motilin, and IL-6. Growth factors secreted at the injury site affect tissue remodeling by allowing cell proliferation and migration as well as increasing vascularization of the regenerated tissue.<sup>60</sup> VEGF is involved in cell proliferation, angiogenesis, and the formation of microvascular tubes and plays a crucial role in ulcer healing. Our study found that the combination of Anweiyang capsules and Western medicine was associated with increased VEGF levels. Relief of epigastric pain, the main clinical symptom of peptic ulcers, can alleviate patients’ suffering and improve their quality of life. This study found that the combi-

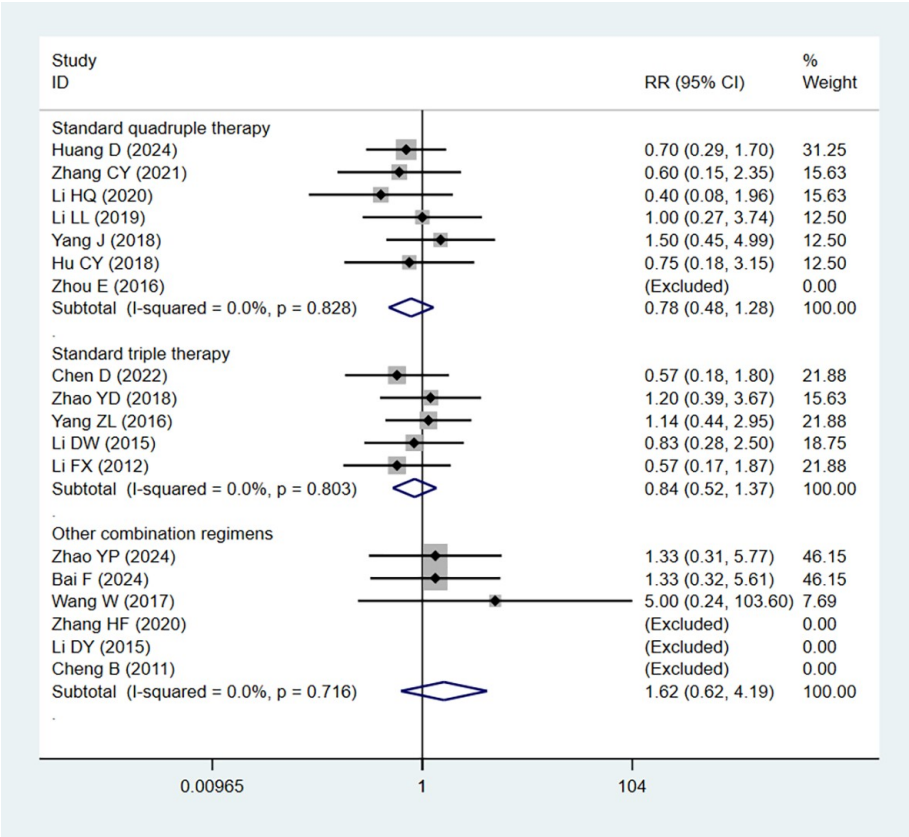


**Figure 8** Forest plot of subgroup meta-analyses for the risk of adverse events, grouped by categories of Western medicine regimens

Notes: CI: confidence interval; RR: risk ratio.

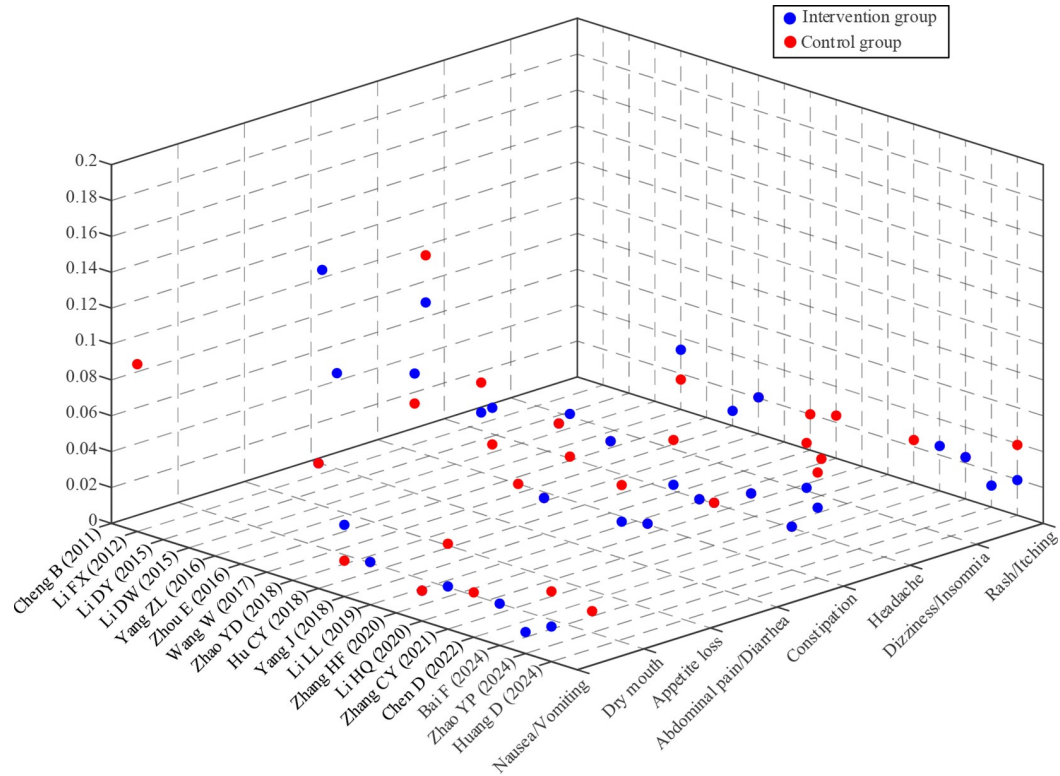


**Figure 9** Three-dimensional guidance diagram of adverse event incidence rates

Notes: The X-axis represents the names of randomized controlled trials recording adverse reactions, the Y-axis represents the names of adverse reaction events, and the Z-axis represents the proportion of adverse reaction events.

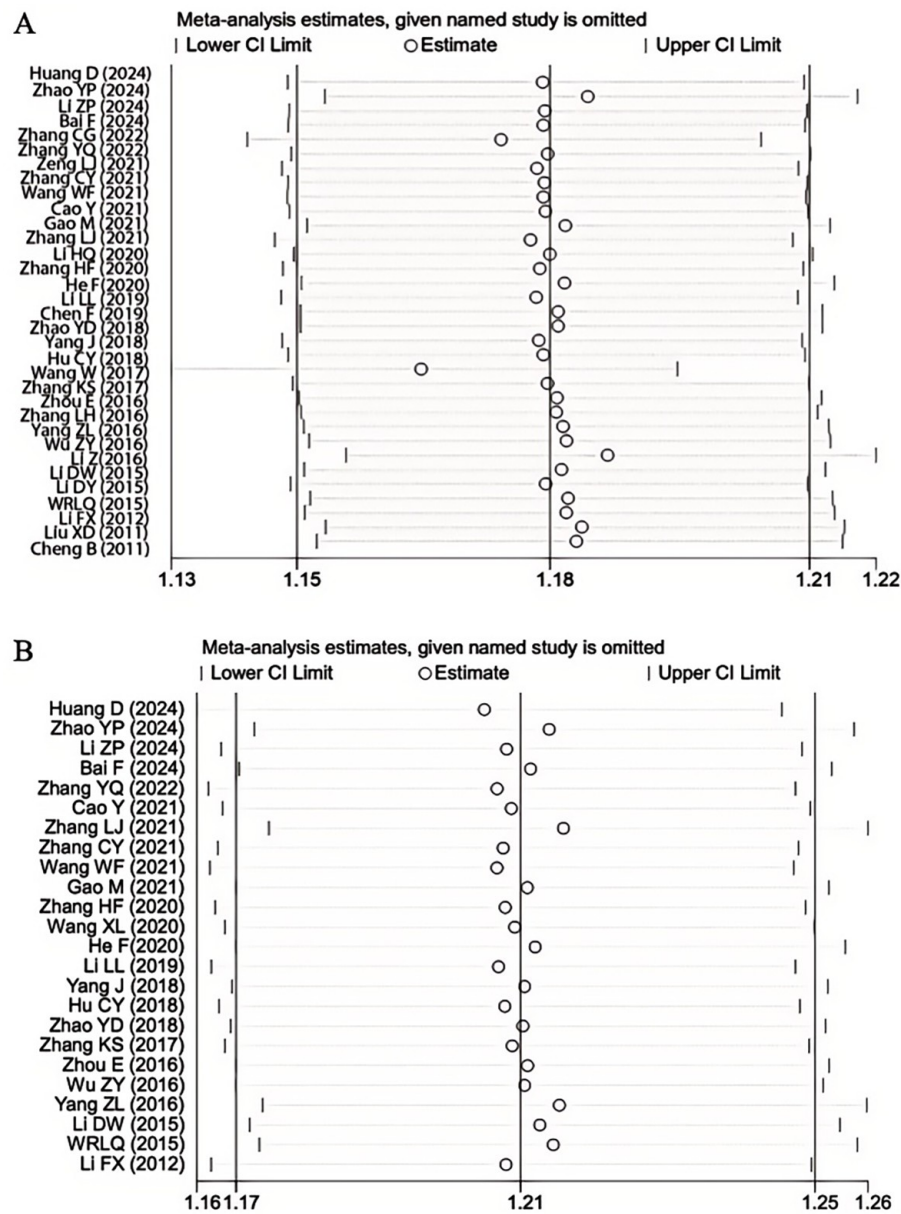


Figure 10 Sensitivity analysis of (A) clinical effectiveness and (B) *Helicobacter pylori* eradication rate

nation of Anweiyang capsules and Western medicine reduced the TCM syndrome scores for epigastric pain. In addition, complete healing and recurrence prevention are important clinical issues in the treatment of PUD. A lower recurrence rate of PUD can improve patient prognosis and prevent the risk of complications. The results of this meta-analysis showed that the combination of Anweiyang capsules and Western medicine can reduce the recurrence rate of peptic ulcers.

4.2. Comparison with previous systematic reviews

Anweiyang capsule, a type of traditional Chinese medicine, has been clinically applied as an adjuvant therapy for decades. Several studies have reported that the addition of Anweiyang capsules may be beneficial in patients with PUD.<sup>24,28</sup> Although statistical analyses of published clinical trials have previously been conducted, the exact therapeutic effects have not yet been systematically evaluated because of limitations such as small sample sizes and differing study protocols. Therefore, in the present study, we performed a wide-ranging online search according to strict inclusion and exclusion criteria to draw a clear and systematic conclusion.

Two recent network meta-analyses (NMAs) assessed Anweiyang capsules as part of broader comparisons of multiple Chinese patent medicines for *H. pylori*-positive peptic ulcers. Jiang et al.<sup>61</sup> showed that Anweiyang capsules combined with triple/quadruple therapy was associated with improved ulcer healing (RR = 1.55). Similarly, Zhong et al.<sup>62</sup> observed significant clinical effectiveness and reductions in gastrin/motilin levels.

Unlike these multi-intervention NMAs, the present meta-analysis focused exclusively on Anweiyang capsules, allowing the inclusion of a considerably larger number of RCTs ( $n = 36$ ) and more recent evidence (up to May 1, 2026). This larger dataset enabled robust subgroup analyses based on the background Western regimen, consistently demonstrating benefits across standard quadruple, triple, and other therapies. Moreover, we examined a broader range of biological and symptomatic outcomes, including IL-6 levels, VEGF levels, and TCM syndrome scores, which have not been uniformly addressed in previous studies. Therefore, our study confirms and substantiates the efficacy and safety signals observed in prior NMAs while offering a more comprehensive and regimen-stratified evidence base specifically for Anweiyang capsules as an adjunctive treatment for peptic ulcer disease.

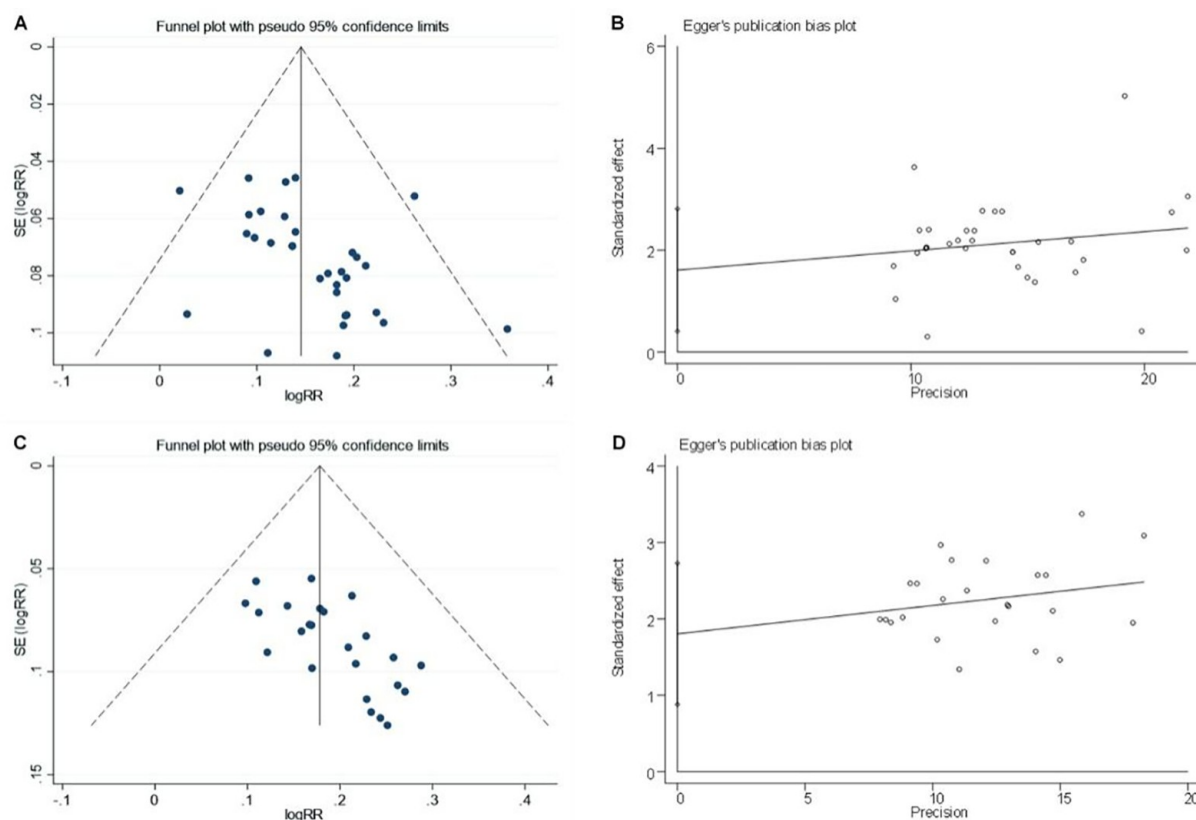


**Figure 11** Publication bias detection and Egger's test for clinical effectiveness and *Helicobacter pylori* eradication rates. (A) Funnel plot for clinical effectiveness, (B) Egger's test for clinical effectiveness, (C) Funnel plot for *H. pylori* eradication rates, and (D) Egger's test for *H. pylori* eradication rate.

Notes: *H. pylori*: *Helicobacter pylori*; SE: standard error; RR: risk ratio.

### 4.3. Potential mechanisms

The main active ingredient in Anweiyang capsules is *G. uralensis* extract. Anweiyang capsules contain nine flavonoid components and one triterpenoid component. The main flavonoid component is licochalcone A, which also contains a triterpenoid component, glycyrrhetic acid.<sup>63</sup> The root of *G. uralensis* is a key traditional Chinese medicine known for its detoxifying, spleen-nourishing, and qi-replenishing properties. The active compounds present in *G. uralensis* have been found to possess multiple biological activities, including antitumor, anti-inflammatory, antiviral, antimicrobial, immunoregulatory, cardioprotective, and neuroprotective functions.<sup>64</sup> Licochalcone A has anti-inflammatory and anticancer activities and has also been reported to possess anti-bacterial, antifungal, antiparasitic, and intestinal protective effects.<sup>65</sup> Similarly, Glycyrrhetic acid exhibits a wide range of significant biological effects, including anti-inflammatory, hepatoprotective, antiviral, and cytotoxic effects.<sup>66</sup>

### 4.4. Strengths and limitations

Our study has several noteworthy strengths. Notably, we conducted a comprehensive meta-analysis of previously published RCTs. The outcomes, characterized by low heterogeneity, demonstrated consistency among studies, bolstering the credibility of our conclusions. To ensure robust results, we performed meticulous sensitivity analyses, publication bias assessments, and subgroup analyses and employed Egger's test to detect potential publication bias. Methodological rigor was further ensured using the Risk of Bias 2.0 tool to evaluate each study.

Nevertheless, this study has some limitations that warrant careful consideration. First, inherent shortcomings were identified in the included RCTs. Specifically, blinding was not implemented in any of the 36 RCTs, despite its

critical importance in ensuring trial fairness and minimizing bias. Although challenging, blinding remains essential for methodological rigor. Future studies should address these methodological limitations. Additionally, none of the 36 RCTs registered their protocols, leading to a lack of transparency in trial design, implementation, and completion, which poses a challenge for potential replication and contributes to selective reporting bias.<sup>67</sup> Moreover, according to the GRADE evaluation, most studies were rated as low-quality, underscoring the need for improvements in the quality and methodology of current RCTs.

Second, some limitations pertain to the meta-analysis itself. The total sample size was relatively small, which may limit the generalizability and stability of the results. Furthermore, all included RCTs were conducted in China, potentially limiting the applicability of our findings to other populations and healthcare settings. The control regimens also varied considerably across studies, including quadruple, triple, dual, and monotherapy, introducing clinical heterogeneity that could confound the true effects of Anweiyang capsules. For secondary outcomes such as gastrointestinal hormone levels, inflammatory factors, and TCM syndrome scores, the analyses were based on a limited number of studies, which reduced the precision and reliability of these estimates. Safety evaluations were limited by incomplete adverse event reporting, as only 18 of the 36 RCTs provided relevant data. Moreover, according to the GRADE assessment, the quality of evidence for most outcomes was rated as low or very low, primarily due to the risk of bias, inconsistency, and imprecision.

Finally, potential conflicts of interest and funding sources raise additional concerns. One concern is that the present review was supported by a commercial grant (HXGSHT-BZYSY-2022-023). Although the study strictly adhered to PRISMA guidelines and independent review procedures were implemented throughout the review process, commercial sponsorship may

| Certainty assessment                    |                   |                           |                           |              |             |                                     | No. of patients   |                   | Effect                             | Certainty                       | Importance |
|-----------------------------------------|-------------------|---------------------------|---------------------------|--------------|-------------|-------------------------------------|-------------------|-------------------|------------------------------------|---------------------------------|------------|
| No. of studies                          | Study design      | Risk of bias              | Inconsistency             | Indirectness | Imprecision | Other considerations                | Intervene         | Compare           | Effect size (95% CI)               |                                 |            |
| Clinical effectiveness                  |                   |                           |                           |              |             |                                     |                   |                   |                                    |                                 |            |
| 33                                      | Randomized trials | Serious <sup>a</sup>      | Not serious               | Not serious  | Not serious | Publication bias strongly suspected | 1553/1647 (94.3%) | 1308/1648 (79.4%) | RR = 1.18<br>95% CI: 1.15, 1.21    | ⊕⊕○○<br>Low <sup>a</sup>        |            |
| Helicobacter pylori eradication rate    |                   |                           |                           |              |             |                                     |                   |                   |                                    |                                 |            |
| 24                                      | Randomized trials | Serious <sup>a</sup>      | Not serious               | Not serious  | Not serious | Publication bias strongly suspected | 1053/1130 (93.2%) | 876/1129 (77.6%)  | RR = 1.21<br>95% CI: 1.17, 1.25    | ⊕⊕○○<br>Low <sup>a</sup>        |            |
| Gastrin                                 |                   |                           |                           |              |             |                                     |                   |                   |                                    |                                 |            |
| 11                                      | Randomized trials | Very serious <sup>a</sup> | Very serious <sup>b</sup> | Not serious  | Not serious | Publication bias strongly suspected | 595               | 596               | MD = 15.16<br>95% CI: 15.00, 20.31 | ⊕○○○<br>Very low <sup>a,b</sup> |            |
| Motilin                                 |                   |                           |                           |              |             |                                     |                   |                   |                                    |                                 |            |
| 6                                       | Randomised trials | Serious <sup>a</sup>      | Very serious <sup>b</sup> | Not serious  | Not serious | Publication bias strongly suspected | 294               | 294               | MD = 1.59<br>95% CI: 1.40, 1.78    | ⊕○○○<br>Very low <sup>a,b</sup> |            |
| IL-6                                    |                   |                           |                           |              |             |                                     |                   |                   |                                    |                                 |            |
| 5                                       | Randomized trials | Serious <sup>a</sup>      | Serious <sup>c</sup>      | Not serious  | Not serious | None                                | 221               | 221               | MD = 3.24<br>95% CI: 2.55, 3.93    | ⊕⊕○○<br>Low <sup>a,c</sup>      |            |
| VEGF                                    |                   |                           |                           |              |             |                                     |                   |                   |                                    |                                 |            |
| 6                                       | Randomized trials | Serious <sup>a</sup>      | Very serious <sup>b</sup> | Not serious  | Not serious | Publication bias strongly suspected | 283               | 283               | MD = 0.87<br>95% CI: 1.71, 1.03    | ⊕○○○<br>Very low <sup>a,b</sup> |            |
| TCM syndrome scores for epigastric pain |                   |                           |                           |              |             |                                     |                   |                   |                                    |                                 |            |
| 7                                       | Randomized trials | Very serious <sup>a</sup> | Very serious <sup>b</sup> | Not serious  | Not serious | Publication bias strongly suspected | 355               | 356               | MD = 0.58<br>95% CI: 0.11, 1.05    | ⊕○○○<br>Very low <sup>a,b</sup> |            |
| PUD recurrence rate                     |                   |                           |                           |              |             |                                     |                   |                   |                                    |                                 |            |
| 8                                       | Randomized trials | Serious <sup>a</sup>      | Not serious               | Not serious  | Not serious | Publication bias strongly suspected | 19/333 (5.7%)     | 65/334 (19.5%)    | RR = 0.30<br>95% CI: 0.19, 0.48    | ⊕⊕○○<br>Low <sup>a</sup>        |            |

**Figure 12 Results of the GRADE evidence evaluation**

**Notes:** CI: confidence interval; GRADE: Grading of Recommendations, Assessment, Development and Evaluation; IL-6: interleukin-6; MD: mean difference; PUD: peptic ulcer disease; RCTs: randomized controlled trials; RR: relative risk; TCM: traditional Chinese medicine; VEGF: vascular endothelial growth factor. <sup>a</sup>: Clinical trials have certain flaws in allocation concealment and blinding. <sup>b</sup>: Included studies have heterogeneity above 75%. <sup>c</sup>: Included studies have heterogeneity between 25% and 75%.

still introduce the potential for interpretative bias. Additionally, transparency regarding funding and conflicts of interest was notably deficient among the included primary studies; only one trial reported a government funding source, two explicitly declared no conflicts of interest, and the remaining 34 trials provided no such disclosures. This widespread lack of information substantially limited our ability to assess potential sponsorship bias at the individual trial level. Considering these concerns, readers are advised to interpret the findings cautiously.

#### 4.5. Implications for future research

Future research should include large-scale studies to further validate our findings. We also recommend that future researchers prioritize the implementation of blinded and registered clinical trials to enhance the quality and credibility of their studies. Although Anweiyang capsules are widely used in clinical settings and are generally regarded as safe, some studies have indicated that they can occasionally lead to hypertension and hypokalemia.<sup>68</sup> These severe adverse reactions, although rare, underscore the necessity of conducting regular medical examinations to ensure the safe use of Anweiyang capsules.

## 5. Conclusion

Due to the very low to low quality of the included studies, no definitive conclusion can be drawn. Nonetheless, current evidence preliminarily suggests that Anweiyang capsules, when combined with Western medicine, may enhance clinical effectiveness in patients with PUD, improve the *H. pylori* eradication rate, ameliorate gastrointestinal hormone and inflammatory

marker levels, reduce TCM syndrome scores for epigastric pain, and decrease PUD the recurrence rate of PUD. However, these potential benefits require further confirmation through rigorously designed studies. Therefore, future research should focus on conducting high-quality, large-scale RCTs to provide more definitive evidence regarding the efficacy and safety of Anweiyang capsules in the treatment of PUD.

## Funding

This work was supported by the Comprehensive Evaluation Study of Anweiyang capsules (grant no.: HXGSHT-BZYSY-2022-023).

## Data Availability

Additional data related to this paper may be obtained from the corresponding author upon reasonable request.

## Author Contribution Statement

**Hong-san Zhang:** Data curation, methodology, software, formal analysis, visualization, and writing – original draft. **Zhi-jun Bu:** Data curation, formal analysis, methodology, visualization, and writing – review & editing. **Yuan Sun:** Methodology, software, and writing – review & editing. **Shi-yu Tian:** Methodology, visualization, and writing – review & editing. **Yuan-hang Zhao:** Formal analysis and writing – review & editing. **Kang Han:** Investigation and writing – review & editing. **Zhao-lan Liu:** Supervision and writing–review & editing. **Hui-lan Liu:** Conceptualization, formal analysis, data cura-

tion, funding acquisition, methodology, project administration, supervision, and writing – review & editing.

## Use of an AI statement

None.

## Declaration of Competing Interest

This study was supported by the Comprehensive Evaluation Study of Anweiyang capsules (grant no.: HXGSHT-BZYSY-2022-023), which was funded by Xinjiang Quan'an Pharmaceutical Co., Ltd. The funder had no role in the study design, data collection, data analysis, data interpretation, or manuscript preparation. No employee, officer, or board member of the funding company served as an author or contributed to any part of this review. None of the authors is an employee, consultant, or stockholder of the funder.

Given the financial support from the manufacturer of the product under evaluation, the authors acknowledge the potential for non-financial conflict of interest regarding the interpretation of the results. To minimize bias, we adhered to a pre-registered protocol (PROSPERO: CRD420251087273), performed independent duplicate study selection and data extraction, and conducted sensitivity analyses, excluding any primary study directly funded by the manufacturer. All conclusions were based solely on the available evidence, and the final decision to submit the manuscript was made independently by the authors without any influence from the funder.

## Electronic Supplementary Material

The online version contains supplementary material available at <https://doi.org/10.26599/eCMTA.2026.9570034>.

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