Review Article
Danshen Formulae for Cancer: A Systematic Review and Meta-Analysis of High-Quality Randomized Controlled Trials

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Objective. Cancer is one of the most dangerous diseases to human life and there is no radical cure for it. In this paper, we compiled quantities of case history to evaluate the current available evidence of herbal Danshen (Radix Salviae Miltiorrhizae, RSM) formulae for the treatment of cancer by means of the high-quality randomized controlled trials (RCTs). Methods. English and Chinese electronic databases were searched from PubMed, the Cochrane Library, EMBASE, and the China National Knowledge Infrastructure (CNKI), VIP database, Wanfang database until September 2018. The methodological quality of the included studies was evaluated by using the method of Cochrane evidence-based medicine system evaluation, the quality was evaluated by screening the literature that met the requirements, and the Review Manager 5.3 was used for statistical analysis. The pooled odds ratio (OR) with 95% CIs was used to estimate the correlation between Danshen formulae and therapeutic effects. Results. Thirteen RCTs with 1045 participants were identified. The studies investigated the lung cancer (n = 5), leukemia (n = 3), liver cancer (n = 3), breast or colon cancer (n = 1), and gastric cancer (n = 1). A total of 83 traditional Chinese medicines were used in all prescriptions and there were 3 different dosage forms. Meta-analysis suggested that Danshen formulae had a significant effect on RR (response rate) (OR 2.38, 95% CI 1.66-3.42), 1-year survival (OR 1.70 95% CI 1.22-2.36), 3-year survival (OR 2.78, 95% CI 1.62-4.78), and 5-year survival (OR 8.45, 95% CI 2.53-28.27). Conclusion. The current research results showed that Danshen formulae combined with chemotherapy for cancer treatment was better than conventional drug treatment plan alone.

1. Introduction
Cancer, also known as malignant tumors, can destroy the structure and function of tissues and organs and cause necrotic hemorrhage and infection, and patients may eventually die due to organ failure. In recent years, the incidence of malignant tumors has increased. In the European Union, it is estimated that there are about 1.4 million new cancer cases in a year, including 1.2 million women, and about 70,000 men and 55,000 women die of cancer [1]. In the United States, cancer morbidity and mortality will continue to rise, and lung cancer is expected to remain the number one cancer killer [2].

As one of the world’s five most intractable diseases, cancer is an incurable disease. If it is not detected and treated in time, it can also be transferred to all parts of the body for growth and reproduction and finally lead to body weight loss, weakness, anemia, loss of appetite fever, damage of viscera function, etc. [3]. The current cancer treatment is mainly surgery, chemotherapy, and radiotherapy, but both of these treatments cannot reduce the recurrence and metastasis after surgery. It is necessary to cooperate with other treatments after the operation [4]. The effects of radiotherapy and chemotherapy are obvious, but the obvious disadvantage is side effects. Cancer patients will be weak because of illness, and their constitution will be worse after chemotherapy and chemotherapy, which will lead to a decline in the quality of life and even make the body weaker and unable to withstand the next treatment [5].

Traditional Chinese medicine (TCM) treatment is a traditional treatment method in China. For cancer, combination of traditional Chinese medicine can promote the rehabilitation of patients and prevent postoperative tumor recurrence and
metastasis. At the same time, traditional Chinese medicine can reduce side effects by radiotherapy and chemotherapy and improve the quality of life (QOL) of patients and even improve the survival rate [6, 7]. The Radix Salviae Miltiorrhizae (Danshen) originated from "Shen Nong’s Herbal Classic" is a well-known TCM herb (China Pharmacopoeia Committee, 2005), and it has been used in clinical practice for over 2000 years. However, there was no consensus on the role of Danshen formulae in cancer treatment [8–20]. To scientifically validate the efficacy and safety of the Danshen formulae, the meta-analysis evaluated the value of Danshen formulae for the treatment of cancer based on high quality randomized controlled trials (RCTs).

2. Methods

This systematic review and meta-analysis are based on the Preferred Reporting Items for Systematic Reviews and Meta Analyses: PRISMA statement search strategy [21].

2.1. Search Strategy. We conducted literature retrieval through 5 database systems including PubMed, the Cochrane Library, EMBASE, and the China National Knowledge Infrastructure (CNKI), VIP database, Wanfang database. The retrieval deadline was September 2018. The main search terms of this paper included the following three parts: (Traditional Chinese Medicine OR Traditional Medicine, Chinese OR TCM OR Zhong Yi Xue OR Chinese Traditional Medicine OR Chinese Medicine, Traditional OR herbal medicine OR Medicine, Chinese Traditional) AND (Neoplasia OR Neoplasias OR Neoplasm OR Tumors OR Tumor OR Cancer OR Malignant Neoplasms OR Malignant Neoplasm OR Neoplasm, Malignant OR Neoplasms, Malignant OR Malignancy OR Malignancies OR Neoplasms). There was no restriction on the type of language. In addition, we used manual references to previously published system reviews to manually search for additional related research. The specific herb name "Danshen" has not been specifically searched to ensure that as many herbal formulae as possible were included.

2.2. Inclusion Criteria. (1) Type of participants: researches involving patients with any type of cancer
   (2) Type of study: only RCTs that assessed the efficacy and safety of cancer treatment were eligible
   (3) Type of intervention: Danshen must be included in the herbal formula used in the experimental group. There were no restrictions on the form of the drug (e.g., decoction, injection, pill, and capsule), dosage, frequency, or treatment time. Control group medications include placebo or conventional medication
   (4) Types of results: the efficacy of cancer treatment was evaluated through OS (overall survival), duration of overall response, duration of stable disease, DFS (disease-free survival), PFS (progression-free survival), TTP (time to progression), TTF (time to failure), DCR (disease control rate), ORR (overall response rate), RR (response rate), CBR (clinical benefit rate), and ORR (objective response rate). Secondary outcome measures were quality of life (QOL) or side effects (such as fatigue, pain, infection/fever, anemia, diarrhea, nausea and vomiting, hair loss, and myelosuppression)
   (5) RoB scored ≥ 4 points

2.3. Exclusion Criteria. If the above conditions were not met, the study was excluded. In addition, the following documents were also excluded: (1) duplicate publications and (2) case series, review, animal studies, and pharmacological experiments, (3) other TCM therapies, such as acupuncture, massage, qigong, moxibustion, and Taiji were included in the study.

2.4. Study Selection. The two reviewers selected the study by screening the title and summary of the selected qualifying RCTs independently. Obtain and read the full text of studies that may meet predefined criteria. When the data were duplicated, only the most recent information is selected. The differences in the study choices were resolved by discussion with the latter corresponding author.

2.5. Quality Assessment. The methodological quality of the included studies was assessed using the risk of bias (RoB) tools, according to Cochran’s Systematic Review Handbook on interventions [22]. Including the following seven contents: (A) random sequence generation (selection bias); (B) allocation concealment (selection bias); (C) blinding of participants and personnel (performance bias); (D) blinding of outcome assessment (detection bias); (E) incomplete outcome data (attrition bias); (F) selective reporting (reporting bias); (G) other bias.

2.6. Data Extraction. Two reviewers used predesigned standard data extraction forms to independently extract data from eligible trials. The excerpts were as follows: (1) the year of publication and the name of the first author, the language of publication, the type of cancer; (2) the characteristics of the participants, including the number, gender, age; (3) treatment information, including intervention management details, treatment process, and side effects; (4) measurement of results.

2.7. Danshen Formulae Composition. In each study, components of Danshen formula were documented, with a frequency analysis of the types of cancer it treated and common drugs combined with it.

2.8. Data Analysis. Dates from eligible researches were aggregated and a quantitative summary was generated by Review Manager 5.3. Egger’s test was carried out by Stata 12.0.

2.9. Effect Size. Dichotomous data were reported as odds ratio (OR) with 95% confidence intervals (CI). The OR was deliberate significant at the P < 0.05 level when value 1 was not taken into the 95% CI. The purpose of this article is to explore the effectiveness of the Danshen formulae; therefore, we take the number of positive events as weights.

2.10. Heterogeneity. The statistical heterogeneity of the trials was assessed using Cochran Q tests and I² statistics. If there
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Studies included in qualitative synthesis (n=13)

Records included in quantitative synthesis (meta-analysis) (n=13)

Records excluded (n=1899)
- not related to cancer (n=366)
- animal experiments (n=434)
- mechanism studies (n=462)
- reviews, protocols, experiences, case reports (n=728)

Full-text articles excluded, with reasons (n=752)
- improper control (n=103)
- no control group (n=50)
- no full text available (n=70)
- not real RCTs (n=200)
- not Danshen formula (n=99)
- other complementary and alternative therapy (n=142)
- Cochrane RoB score < 4 (n=90)

Records after duplicates removed (n=2664)

Records screened (n=2664)

Full-text articles assessed or eligibility (n=765)

Studies included in qualitative synthesis (n=13)

Records identified through database searching (n=3208)

Additional records identified through other sources (n=1)

Figure 1: Flow diagram of literature search and selection.

is no absence of heterogeneity or moderate heterogeneity ($P > 0.1, I^2 < 50\%$) [23], a fixed effect model (FEM) will be used; otherwise, a random effects model (REM) will be applied.

2.11. Publication Bias. If a research project contained more than 10 studies, the funnel plot were used to test publication bias.

2.12. Sensitivity Analysis. Sensitivity analysis was performed to test the effect of a single study on the combined effect by removing the individual survey. If the estimated value of the point after deleting a study fell beyond the 95\% CI of the total effect amount (or was significantly different from the combined effect amount), we considered the study in question to have exerted a great influence on the combined effect amount and that this study required further review.

3. Results

3.1. Description of Studies. A total of 3209 studies were searched by 4 electronic databases and other sources, and 2664 records were retained after deduplication. Of these, 366 studies were unrelated to cancer, 434 were animal experiments, 462 were mechanical experiments, and 728 were reviews, protocols, experiences, or case reports. By reading the full text, 762 studies, including 103 control interventions were inappropriate, lacking 50 of the control group and 70 items without full text, 200 items were not really RCTs, 99 items did not use the Danshen formula, and 142 included other CAM treatments, such as Acupuncture, Qigong, and 90 methodology that is of low quality. In the end, the study included 13 studies with 1045 patients that met the Cochrane Robb score of 4 and conducted a meta-analysis. A PRISMA flowed graph describe the search process and research options (Figure 1).

3.2. Basic Characters of the Included Studies. The characteristics of the 13 studies included the contents summarized in Table 1. All the eligible studies were conducted in China, with four articles published in English [9–11, 13] and the rest in Chinese [8, 12, 14–20] (Table 1). In this study, there are 6 related lung cancers [9–11, 14, 19, 20], 3 related to Leukemia [12, 17, 18], 3 related to Liver cancer [8, 15, 19], one related to breast or colon cancer [13], and one related to gastric cancer [17] (Table 2). Because leukemia is a kind of malignant clonal disease of hematopoietic stem cells and belongs to the category of cancer, this study also included the research of leukemia. There were 10 RCTs with Overall response rate (RR) [8, 10–12, 14–19], 8 RCTs of them showed that Danshen formulae improved RR [10–14], and 2 RCTs suggested that Danshen formulae did not significantly improve RR [8, 11]. In 5 RCTs with survival rates, 4 RCTs of them indicated that Danshen Formulae improved survival rates [9, 15, 18, 20] and 1 RCT indicated that Danshen formulae did not significantly improve RR [8]. Seven RCTs were with side effects [10, 12–15, 17, 20] (Table 1). And the results showed 605 male patients and
| Included trial  | Publication language | Study design and investigation sites | Type of cancer | No. of participants | Intervention | Type of cancer | Outcome index |
|----------------|-----------------------|--------------------------------------|----------------|--------------------|-------------|----------------|---------------|
| Chen 2012 [8]  | Chinese               | RCT, Single center, China            | Liver Cancer   | 48/13               | Danshen formulae | Vinorelbine + Cisplatin (NP) + Placebo (Huangqi, Huangjing, Jiaogulan, Lingzhi, Cangzhu, Nvzhenzi, Huanglian) | 1. RR; 2. Survival rate; 3. Improvement of symptoms |
| Gong 2018 [9]  | English               | RCT, Single center, China            | NSCLC          | 80/51               | Danshen formulae | Platinum-based therapy + Placebo (Jiegeng, Xingren, Yuxingcao, Ziwan, Kuandong, Zhebeimu, Banxia, Hexiancao, Shengdiyu, Huangqin, Dongguazi, Chenpi, Zhurute al.) | 1. Survival Rates; 2. MST |
| Guo 2017 [10]  | English               | RCT, Multi-center, China             | NSCLC          | 20/9                | Platinum-based therapy + Danshen formulae | Radiotherapy | 1. RR; 2. Nausea; 3. Vomit; 4. QOL; 5. Mild gastric/abdominal heaviness |
| Lan 2003 [11]  | Chinese               | RCT, Single center, China            | Lung cancer    | 16/10               | DAP          | Radiotherapy + Danshen formulae | 1. RR, PR; 2. Long-term effect |
| Li 2017 [12]   | Chinese               | RCT, Single center, China            | Leukemia       | 10/15               | DAP + JieduHuayuFang | Radiotherapy + Placebo (Xuanshen, Yiyiren, Chenqianzi, Yinchen, Difuzi, Chuanwu, Ganjiang, Rougui, Wuzhuyu, Xiangfuzi, Chenpi, Shanzha, Laifuzi, Sanqi, Ruxiang, Yuan et al.) | 1. RR (CR + PR); 2. Leukopenia; 3. Platelet (PLT) decreased; 4. Hemoglobin (HGB) decreased |
| Mok 2007       | English               | RCT, Single center, China            | Breast or colon cancer | 5/50               | DAP | Paclitaxel Injection + Cisplatin Injection | 1. HGB decreased; 2. Leukopenia; 3. Neutropenia; 4. Thrombocytopenia; 5. Nausea; 6. QOL |
| Shen 2017 [14] | Chinese               | RCT, Single center, China            | NSCLC          | 22/21               | Paclitaxel Injection + Cisplatin Injection + Zilongjin tablet | 3-DCRT | 1. RR; 2. Leucopenia; 3. Erythropenia; 4. Thrombocytopenia; 5. Nausea; 6. DCR |
| Wang 2010 [15] | Chinese               | RCT, Single center, China            | Primary liver cancer | 28/13               | AixiaoAixiao Ruanganjian UFTM/FMV | 3-DCRT | 1. RR; 2. Leucopenia; 3. Platelet decrease; 4. Hemoglobin reduction. 5. T-cells; 6. Survival rate; 7. Nausea |
| Wen 1996 [16]  | Chinese               | RCT, Single center, China            | Gastric cancer | 8/3                | UFTM/FMV + Jianpi Kangai mixtures | DA/HA/IA | 1. RR |
| Xu 2004 [17]   | Chinese               | RCT, Single center, China            | Acute myeloid leukemia | 19/11             | DA/HA/IA + Danshen formulae | Radiotherapy + Placebo (TizisheN, huangbai, Baizhu, Gouqi, Huangjing, Tiandong, Maidong, Xuanshen, Nvzhenzi, Hanliancao, Pugonging, Banzhilian, Baihuasheshecao, Xiaojie et al.) | 1. RR |
| Yan 1995       | Chinese               | RCT, Single center, China            | Acute myeloid leukemia | 16/10              | DA/HA/IA + Danshen formulae | Radiotherapy + Placebo (FufangBanmaoCapsule, Fuzhengkangai decoction) | 1. RR |
| Zhang 2013 [20]| Chinese               | RCT, Single center, China            | Liver cancer    | 20/4                | General symptomatic treatment + FulingKunmama Capsule + UFTM/FMV + Danshen formulae | Radiotherapy + Placebo (TangShen, Huangqin, Zhiqing, Yuanyuan, Xiexin, Xiexing, Pu Hua, Guoqiang, Hua, Cai, Xue et al.) | 1. RR |

**Table 1:** Basic characteristics of the included studies.
Table 2: Types of cancer.

| Types of cancer       | Included trial(s) | Sex(male/female); Total Frequency |
|-----------------------|-------------------|-----------------------------------|
| Lung cancer           | Gong 2018, Guo 2017, Lan 2003, Shen 2017, Zhang 2013 | 146/93, 48/13, 29/18, 45/41, 48/30 | Total:316/195 |
| Leukemia              | Li 2017, Xu 2004, Yan 1995, Chen 2012, Wang 2010, Zeng 2015 | 23/27, 39/21, 34/36, 79/19, 53/27, 39/9 | Total:96/84 |
| Liver cancer          | Chen 2012, Wang 2010, Zeng 2015 | 79/19, 53/27, 39/9 | Total:171/55 |
| Gastric cancer        | Wen 1996, Mok 2007 | 11/6, 11/100 | Total:11/100 |
| Breast or colon cancer|                   |                           |               |

440 female patients included in this study (Table 2). Among the 13 RCTs, 3 different Danshen formulae dosage forms were mentioned, I was a granule [17], I was a tablet [14], and the rest were decoction [8–13, 15, 16, 18–20]. In 8 Danshen formulae, Danshen plays a major role [8, 9, 12, 14–16, 19, 20] and improves the survival rate of patients; in 3 Danshen formulae, Danshen plays an auxiliary role [10, 17, 18] and, in 2 RCTs, the real effect is that of other medicinal materials [11, 13]. It should be noted that one study did not involve radiotherapy, chemotherapy, or surgical treatment [19], while the rest were combined Chinese and western medicine (Table 3).

3.3. Description of the Danshen Formulae. Table 2 details the components of the Danshen formulae in each study: 83 kinds of herbs were used in 13 different Danshen formulae and three dosage forms were mentioned, namely, decoction (n=11), tablets (n=1), and formula particles (n=1) (Table 3). The 9 most commonly used herbs were Radix Salviae Miltiorrhizae (frequency=13), Astragalus mongholicus bunge (frequency=8), Rhizoma atractylodis Macrocephalae (frequency=5), Curcuma zedoaria (frequency=4), Agkistrodon seu bungarus (frequency=4), Poria (frequency=4), Adenophora stricta (frequency=3), Glycyrrhiza uralensis (frequency=3), and Portulaca grandiflora hook (frequency=3) (Table 4).

3.4. RoB Assessment. The RoB evaluation is shown in Table 4. All studies are described as random. Twelve RCTs mentioned random allocation methods, including random sampling, picking method, hospitalization time, completely randomized digital table, and stratified permuted block method, and the rest of the study had only the words “randomized grouping”. 1 RCT explicitly proposed that the study was conducted by a single blind method [9], 2 RCT explicitly proposed the use of double-blind method in the title or abstract [10, 13], and the rest of the studies were relatively vague about the blind method, and we need to get relevant information by reading the full text. As shown in the table, among the 13 studies, 3 articles scored 5 points [9, 10, 13], and the rest were scored 4 points [8, 11, 12, 14–20] (Table 5).

3.5. Effectiveness

3.5.1. Cancer Patients Treated with Additional Danshen Formulae Have a Significantly High RR. Ten studies [8, 10–12, 14–19] analyzed RR, indicating the RR of the experimental group was higher than that of the control group (OR 2.38, 95% CI 1.66-3.42) (Figure 2). Heterogeneity test $P = 0.21$, $I^2 = 25\%$ showed 13 included articles with no heterogeneity, so the statistical analysis with fixed effects model. Pooled OR with 95% CIs showed $Z = 4.71$, $P<0.00001$ (Figure 2), suggesting that the difference was statistically significant. It can be considered that the RR of Danshen formulae with the general treatment regimen was higher to the control scheme without the Danshen formulae.

3.5.2. 1-Year Survival Rate. The total clinical efficacy rate 1-year survival rate between experimental group and control group was reported in 7 studies [8, 9, 11, 15, 18–20]. Compared with the control group, the 1-year survival rate was significantly improved after adding Danshen formulae (OR 1.70 95% CI 1.22-2.36, $Z = 3.13$, $P=0.002$), and there was a low heterogeneity ($P = 0.27$, $I^2 = 21\%$) (Figure 3).

3.5.3. 3-Year Survival Rate. Four researches [9, 11, 18, 20] focused on 3-year survival rate between two groups. Pooled
| Included trials | Chuanxiong formula | Latin name | Ingredient name | Chinese name | Dosage (g) |
|-----------------|--------------------|------------|-----------------|--------------|------------|
| Chen 2012       | Gexiazhuyu decoction | Radix salviae miltiorrhiza | Danshen root | Danshen | 9 |
|                 |                    | Astragalus mongholicus | Milkvet Root | Huangqi | 14 |
|                 |                    | Semen persicae | Peach seed | Taoren | 9 |
|                 |                    | Flos carthami | Safflowe | Honghua | 6 |
|                 |                    | Paoni | paenol | Danpi | 12 |
|                 |                    | Rhizoma cypri | Nutgrass galangale rhizome | Xiangfu | 10 |
|                 |                    | Fructus citri aurantii immaturus | Immature bitter orange | Zhiqiao | 12 |
|                 |                    | Agkistrodon seu bungarbus | Hedyotis diffusa | Baihuasheshcao | 16 |
|                 |                    | Radix scrophulariae ningpoensis | Radix scrophulariae | Xuanseh | 14 |
| Gong 2018       | Jupi Zhuru decoction | Radix salviae miltiorrhiza | Danshen root | Danshen | 15 |
|                 |                    | Pericarpium citri reticulatae | Dried Tangerine | Chenpi | 9 |
|                 |                    | Pinellia ternata | Rhizoma pinelliae | Jiangbanxia | 9 |
|                 |                    | Bambusa turdoides munro | Bamboo shavings | Jiangzhuru | 9 |
|                 |                    | Zizyphus jujuba | Chinese date | Dazao | 9 |
|                 |                    | Glycyrrhiza uralensis | Liquorice root | Gancao | 6 |
| Guo 2017        | TCM formulae decoction | Astragalus mongholicus | Milkvet Root | Huangqi | 30 |
|                 |                    | Rhizoma atractylodis macrocephalae | Largehead atractylodes | Baizhu | 9 |
|                 |                    | Poria | Poria cocos | Fuling | 15 |
|                 |                    | Radix glehniae | Coastal glehnia root | Beiashen | 30 |
|                 |                    | Radix adenophorae | Fourleaf ladybell root | Nanshashen | 30 |
|                 |                    | Radix asparagi | Cochinchesine asparagus root | Tiandong | 15 |
|                 |                    | Radix ophiopogonis | Dwarf lihturf tuber | Maidong | 15 |
|                 |                    | Radix salviae miltiorrhiza | Danshen root | Danshen | 30 |
|                 |                    | Selaginella dooderleinii hicr | Selaginella dooderleinii | Shishangbai | 30 |
| Included trials | Chuanxiong formula | Latin name          | Ingredient          | Chinese name | Dosage (g) |
|-----------------|--------------------|---------------------|---------------------|--------------|------------|
| Lan 2003        | TCM formulae decoction | Adenophora stricta | Radix Adenophorae   | Shashen      | 30         |
|                 |                    | Bulbus fritillariae cirrhosae | Tendrilleaf fritillary bulb | Chuanbeimu | 10         |
|                 |                    | Astragalus mongholicus bunge | Milkvetch root | Huangqi | 30         |
|                 |                    | Ophiopogon japonicus | Dwarf lilypert tuber | Maidong | 15         |
|                 |                    | Fallopia multiflora | Tuber fleeceflower root | Heshouwu | 30         |
|                 |                    | Rehmannia glutinosa | Prepared rehmannia root | Shudihuang | 10         |
|                 |                    | Dioscorea opposita | Common Yam Rhizome | Shanyao | 30         |
|                 |                    | Alismatis Rhizoma | Alisma orientale | Zexie | 15         |
|                 |                    | Fructus Corni | Cornus officinalis | Shanzhuyu | 10         |
|                 |                    | Glycyrrhiza uralensis | Liquorice root | Gancao | 10         |
|                 |                    | Rhizoma Phragmites | Reed rhizome | Lugan | 30         |
|                 |                    | Lonicera japonica Thumb | Lonicera japonica | Jinyinhua | 15         |
|                 |                    | Morus alba L. | White mulberry root-bark | Sangbaipi | 15         |
|                 |                    | Radix Sophorae Tonkinensis | Radix sophorae tonkinensis | Shandougen | 15         |
|                 |                    | Gypsum fibrosum | Gypsum fibrosum | Shengshigao | 30         |
|                 |                    | Scutellariae baicalensis | Radix scutellarieae | Huangqin | 15         |
|                 |                    | Codonopsis pilosula | Danshen root | Danshen | 30         |
|                 |                    | Radix et rhizoma rhei | Rhubar | Dahuang | 15         |
| Included trials | Chuanxiong formula | Latin name | Ingredient | English name | Chinese name | Dosage (g) |
|-----------------|--------------------|------------|------------|--------------|--------------|------------|
| Li 2017         | Jiedu Huayu Fang   | Lygodium japonicum | Indigo Naturals | Qindai       | Not mentioned |
|                 |                    | Paris polyphylla Smith | Flea | Zaoxiu | Buguzhi |
|                 |                    | Fructus Psoraleae | Psoraleae | Huzhang | Danshen |
|                 |                    | Rhizoma Polygoni Cuspidati | Polygonum cuspidatum | Danshen | Baizhu |
|                 |                    | Radix salviae miltiorrhizae | Danshen root | Shancigu |
|                 |                    | Atractylodes macrocephala Koidz | Largehead atractylodes rhizo | Chuanxiong |
|                 |                    | Asarum sagittarioides | Cremastra appendiculata | Chuanxiong |
|                 |                    | Rhizoma Ligustici Chuanxiong | Sichuan lovage rhizome | Chuanxiong |
| Mok 2007        | TCM formulae granules | Curcuma zedoaria | Rhi zoma curcumae | Ezhu | Not mentioned |
|                 |                    | Sparganium simplex Huds | Rhi zona spargani | Sanling | Danshen |
|                 |                    | Radix salviae miltiorrhizae | Danshen root | Yimucao |
|                 |                    | Leonurus artemisia | Herba leonuri | Xuan shen |
|                 |                    | Radix scrophulariae | Scrophularia ningpoensis | Zhuling |
|                 |                    | Polyergus | Polyergus umbellatus | Yi yiren |
|                 |                    | Coix lacrymajobi | Coix seed | Cheqianzi |
|                 |                    | Semen Plantaginis | Plantain seed | Cheqianzi |
|                 |                    | Herba lysimachiae | Longhaia antenor Herb | Jinqiangao |
|                 |                    | Spora lygodii | Lygodium japonicum | Haijinsha |
| Shen 2017       | Zilongjiin Tablet  | Astragalus mongholicus | Milkvetch root | Huangqi |
|                 |                    | Radix angelica hinensis | Chinese angelica | Danggui |
|                 |                    | Solanum lyrum thunb | Solanum lyrum thunb | Baiying |
|                 |                    | Solanum nigrum | Nightshade | Longkui |
|                 |                    | Radix salviae miltiorrhizae | Danshen root | Danshen |
|                 |                    | Portulaca grandiflora hook | Scutellariae barbatae | Banzhilian |
|                 |                    | Duchesnea indica | Duchesnea | Shimei |
|                 |                    | Turmeric Curcuma | Turmeric | Yujin |
| Wang 2010       | Aixiao Ruanganjian | Panax ginseng | Ginseng | Renshen |
|                 |                    | Curcuma zedoaria | Rhi zoma Curcumae | Ezhu |
|                 |                    | Radix salviae miltiorrhizae | Danshen root | Danshen |
|                 |                    | Semen coicis | Coix seed | Yi yiren |
|                 |                    | Spreading hedyotis herb | Hedyotis diffusa | Baihuasheshao |
|                 |                    | Portulaca grandiflora hook | Scutellariae barbatae | Banzhilian |
|                 |                    | Blutilla striata | Blutilla | Baiji |
|                 |                    | Rehmannia glutinosa | Smilax glabra | Tufuling |
|                 |                    | Semen persicae | Peach seed | Taoren |
|                 |                    | Rafetus swinhoei | Cantharides | Banao |
|                 |                    | Lycium dasystemum Pojark | Babury wolfberry fruit | Gouqizi |
|                 |                    | Trionyx sinensis | Trionyx carapax | Bieja |
|                 |                    | Rhizoma paridis | Flea | Zaoxiu |
|                 |                    | Radix sophora flavescents | Lightylow sophora root | Kushen |
| Wen 1996        | Jianpi Kangai decoction | Pseudostellaria heterophylla | Radix pseudostellariae | Taizishen |
|                 |                    | Atractylodes macrocephala koidz | Roasted rhizoma atractylax | Chaobaizhu | 12 |
|                 |                    |                         |                         | 12 |
Table 3: Continued.

| Included trials | Chuanxiong formula | Latin name | Ingredient | English name | Chinese name | Dosage (g) |
|-----------------|--------------------|------------|------------|--------------|--------------|------------|
|                 |                    | Poria      | Poria cocos| Fuling       | 12           |
|                 |                    | Rhizoma pinelliae ternatae | Pinellia tuber | Banxia | 12 |
|                 |                    | ericarpium citri reticulatae | Tangerine Peel | Chenpi | 12 |
|                 |                    | Radix salviae miliortrhizae | Danshen root | Danshen | 20 |
|                 |                    | Sargentoxyca cuneata | Sargent gloryvine | Hongteng | 20 |
|                 |                    | Smilax china | Smilax china | Baqia | 30 |
|                 |                    | Concha ostreae | Oysters | Shengmuli | 30 |
|                 |                    | Prunella vulgaris | Self heal | Xiuakucao | 30 |
| Xu 2004        | TCM formulae decoction | Radix astragali seu | Milkvetch Root | Shenghuangqi | Not mentioned |
|                 |                    | Rehmannia glutinosa Libosh | Radix rehmanniae | Shenglihuang | Taizishen |
|                 |                    | Dioscorea nipponica Makino | Radix pseudostellariae | Chuanxianlong | Chuanxianlong |
|                 |                    | Radix salviae miliortrhizae | Ningpo yam rhizome | Danheng | Danheng |
|                 |                    | Leonurus artemisia | Radix salviae miliortrhizae | Yimucao | Yimucao |
|                 |                    | Periostracum cicadae | Cicada Slough | Chantui | Chantui |
|                 |                    | Achyranthes bidentata blume | Achyranthes longifolia | Huainiu | Huainiu |
| Yan 1995       | TCM formulae decoction | Astragalus mongholicus | Milkvetch root | Huangqi | 15 |
|                 |                    | Codonopsis pilosula | Codonopsis | Dangshen | 15 |
|                 |                    | Atractyloides macrocephala Koidz | Largehead atractylodes rhizo | Baizhu | 15 |
|                 |                    | Poria | Poria cocos | Fuling | 12 |
|                 |                    | Radix Angelicae Sinensis | Chinese angelica | Danggui | 15 |
|                 |                    | Colla corii Asini | colla corii asini | Ajiao | 15 |
|                 |                    | Lycium dasystemum Pojark | Babury Wolfberry Fruit | Gouqizi | 15 |
|                 |                    | Fructus psoraleae | Psoraleae | Buguzhi | 15 |
|                 |                    | Fallopia multiflora | Tuber fleeceflower root | Heshouwu | 15 |
|                 |                    | Spreading hedyotis Herb | Hedyotis diffusa | Baihuashexiao | 20 |
|                 |                    | Herba cirsi setosi | Common cephalanoplos herb | Xiaoji | 15 |
|                 |                    | Radix salviae miliortrhizae | Danshen root | Danshen | 15 |
|                 |                    | Millettia diesiana | Caulis spaltholobi | Jixueteng | 15 |
|                 |                    | Sparganium simplex Huds | Rhizoma spargani | Sanleng | 15 |
|                 |                    | Curcuma zedoaria | Rhizoma curcumae | Ezhu | 15 |
| Included trials | Chuanxiong formula | Ingredient | Latin name | English name | Chinese name | Dosage (g) |
|----------------|-------------------|------------|------------|--------------|--------------|------------|
| Zeng 2015      | Fuzhengkangai decoction | Cynanchum paniculatum | Paniculate swallowwort root | Xuchangqing | 20 |
|                |                   | Atractylodes macrocephala | Largehead atractylodes rhizo | Shengbaizhu | 15 |
|                |                   | Turmeric Curcumae | Turmeric | Yujin | 12 |
|                |                   | Radix salviae miltiorrhize | Danshen root | Danshen | 30 |
|                |                   | Artemisia capillaris Thunb | Virgate wormwood herb | Yinchen | 30 |
|                |                   | Fructus citri aurantii immatur | Immature bitter orange | Chaozhishii | 15 |
|                |                   | Portulaca grandiflora hook | Scutellariae barbatae | Banzhilian | 30 |
|                |                   | Solanum lyratum thunb | Solanum lyratum thunb | Baiying | 20 |
|                |                   | Astragalus mongholicus | Milkvetch root | Shenghuangqi | 40 |
|                |                   | Cleistocactus sepium | Cuttlebone | Wuzeigu | 20 |
|                |                   | Curcuma zedoaria | Rhizoma curcumae | Ezhu | 10 |
|                |                   | Rhizoma Coptidis | Coptis root | Huanglian | 6 |
|                |                   | Trichosanthes kirilowii Maxim | Pericarpium trichosanthis | Gualoupi | 15 |
| Zhang 2013     | Xidan Tang        | Astragalus mongholicus | Milkvetch root | Huangqi | 30 |
|                |                   | Bletilla striata | Bletilla | Baiji | 12 |
|                |                   | Poria | Poria cocos | Fuling | 15 |
|                |                   | Ganoderma Lucidum Karst | Lucid ganoderma | Lingzhi | 15 |
|                |                   | Radix salviae miltiorrhize | Danshen root | Danshen | 10 |
|                |                   | Rhizoma Ligustici Chuanxiong | Sichuan lovage rhizom | Chuanxiong | 9 |
|                |                   | Euchresta japonica Hook | Vietnamese sophora root | Shandugan | 6 |
|                |                   | Fructus Camptothecae Acuminatae | Common Camptotheca Fruit | Xishuguo | 10 |
|                |                   | Glycyrrhiza uralensis | Liquorice root | Gancao | 5 |
Table 4: The top 9 frequency Chinese herb medicines of formulae.

| Latin name | English name | Chinese name | Frequency | The total frequency (%) | Cumulative percentiles (%) |
|------------|-------------|--------------|-----------|-------------------------|----------------------------|
| Radix salviae miltiorrhizae | Danshen root | Danshen | 13 | 100 | 17.11 |
| Astragalus mongholicus bunge | Milkvetch root | Huangqi | 8 | 61.54 | 10.53 |
| Rhizoma atracynotis macrocephalae | Largehead atractylodes | Baizhu | 5 | 38.46 | 6.76 |
| Curcuma zedoaria | Rhizoma curcumae | Ezhu | 4 | 30.77 | 5.26 |
| Poria | Coastal glehnia root | Fuling | 4 | 30.77 | 5.26 |
| Agristrodon seu bungarus | Hedyotis diffusa | Baihuasheshcaco | 3 | 23.08 | 3.95 |
| Adenophora stricta | Radix Adenophorae | Shashen | 3 | 23.08 | 3.95 |
| Glycyrrhiza uralensis | Liquorice root | Gancao | 3 | 23.08 | 3.95 |
| Portulaca grandiflora hook | Scutellariae barbatae | Banzhilian | 3 | 23.08 | 3.95 |

Table 5: Risk of bias assessments for included studies.

| Included studies | A | B | C | D | E | F | G | Total |
|------------------|---|---|---|---|---|---|---|-------|
| Chen 2012        | + | ? | + | + | + | ? | + | 4    |
| Gong 2018        | + | ? | + | + | + | ? | + | 5    |
| Guo 2017         | + | ? | ? | + | + | + | + | 5    |
| Lan 2003         | + | - | + | - | + | ? | + | 4    |
| Li 2007          | + | - | - | - | ? | + | + | 4    |
| Mok 2001         | + | ? | + | + | + | + | + | 5    |
| Shen 2007        | + | ? | - | ? | + | ? | + | 4    |
| Wang 2001        | + | - | - | - | + | + | + | 4    |
| Wen 1996         | + | ? | ? | - | + | + | + | 4    |
| Xu 2004          | + | ? | ? | + | + | + | - | 4    |
| Yan 1995         | + | - | ? | + | + | - | + | 4    |
| Zeng 2015        | + | - | ? | ? | + | + | + | 4    |
| Zhang 2013       | + | ? | - | - | ? | + | + | 4    |

A, random sequence generation (selection bias); B, allocation concealment (selection bias). C, blinding of participants and personnel (performance bias); D, blinding of outcome assessment(detection bias). E, incomplete outcome data (attrition bias); F, selective reporting (reporting bias); G, other bias. +, low risk of bias; −, high risk of bias; ?, unclear risk of bias.

Figure 2: Meta-analysis of RR in experimental group and control group.
Table 1. Comparison of Danshen formulae between experimental and control groups.

| Study or Subgroup | Experimental | Control | Total | Weight | Odds Ratio | Odds Ratio |
|-------------------|--------------|---------|-------|--------|------------|------------|
|                   | Events | Total | Events | Total | M-H, Fixed, 95% CI | M-H, Fixed, 95% CI |
| Chen 2012         | 12     | 49    | 9     | 49    | 12.6%      | 1.44 [0.54, 3.81] |
| Gong 2018         | 75     | 131   | 57    | 108   | 49.3%      | 1.20 [0.72, 2.00] |
| Lan 2003          | 26     | 26    | 16    | 21    | 0.6%       | 17.87 [0.92, 340.78] |
| Wang 2010         | 18     | 41    | 11    | 39    | 11.7%      | 1.99 [0.79, 5.05] |
| Yan 1995          | 20     | 35    | 9     | 35    | 7.1%       | 3.85 [1.40, 10.59] |
| Zeng 2015         | 15     | 24    | 10    | 24    | 6.9%       | 2.33 [0.73, 7.43] |
| Zhang 2013        | 28     | 36    | 31    | 42    | 11.7%      | 1.24 [0.44, 3.53] |
| Total (95% CI)    | 342    | 318   | 100%  | 100%  | 1.70       | [1.22, 2.36] |

Table 2. Comparison of Danshen formulae between experimental and control groups.

| Study or Subgroup | Experimental | Control | Total | Weight | Odds Ratio | Odds Ratio |
|-------------------|--------------|---------|-------|--------|------------|------------|
|                   | Events | Total | Events | Total | M-H, Fixed, 95% CI | M-H, Fixed, 95% CI |
| Gong 2018         | 22     | 131   | 9     | 108   | 48.9%      | 2.22 [0.98, 5.06] |
| Lan 2003          | 11     | 26    | 2     | 21    | 7.6%       | 6.97 [1.34, 36.34] |
| Yan 1995          | 12     | 35    | 5     | 35    | 19.6%      | 3.13 [0.97, 10.15] |
| Zhang 2013        | 10     | 36    | 6     | 42    | 23.8%      | 2.31 [0.74, 7.15] |
| Total (95% CI)    | 228    | 206   | 100%  | 100%  | 2.78       | [1.62, 4.78] |

Table 3. Comparison of Danshen formulae between experimental and control groups.

| Study or Subgroup | Experimental | Control | Total | Weight | Odds Ratio | Odds Ratio |
|-------------------|--------------|---------|-------|--------|------------|------------|
|                   | Events | Total | Events | Total | M-H, Fixed, 95% CI | M-H, Fixed, 95% CI |
| Gong 2018         | 13     | 131   | 2     | 108   | 70.3%      | 5.84 [1.29, 26.47] |
| Lan 2003          | 5      | 26    | 0     | 21    | 15.6%      | 11.00 [0.57, 211.46] |
| Yan 1995          | 7      | 35    | 0     | 35    | 14.1%      | 18.68 [1.02, 341.22] |
| Total (95% CI)    | 192    | 164   | 100%  | 100%  | 8.45       | [2.53, 28.27] |

Table 4. Comparison of Danshen formulae between experimental and control groups.

| Study or Subgroup | Experimental | Control | Total | Weight | Odds Ratio | Odds Ratio |
|-------------------|--------------|---------|-------|--------|------------|------------|
|                   | Events | Total | Events | Total | M-H, Fixed, 95% CI | M-H, Fixed, 95% CI |
| Gong 2018         | 13     | 131   | 2     | 108   | 70.3%      | 5.84 [1.29, 26.47] |
| Lan 2003          | 5      | 26    | 0     | 21    | 15.6%      | 11.00 [0.57, 211.46] |
| Yan 1995          | 7      | 35    | 0     | 35    | 14.1%      | 18.68 [1.02, 341.22] |
| Total (95% CI)    | 192    | 164   | 100%  | 100%  | 8.45       | [2.53, 28.27] |

3.5.4. 5-Year Survival Rate. Three studies recorded 5-year survival rates [9, 11, 18]. Pooled data indicated that experimental group had a higher 5-year survival rate (OR 8.45, 95% CI 2.53-28.27, Z = 3.74, P = 0.0005) than control group with no heterogeneity (P = 0.76, I² = 0%) (Figure 5).

3.6. Publication Bias. The funnel plot and further Egger's test were used to evaluate publication bias for RR of two groups of cancer patients. As the two results, though, showed a left-right asymmetry, but both P>0.05, suggesting that there was no publication bias (Figures 6 and 7).

3.7. Sensitivity Analysis. Our sensitivity analysis did not indicate that the results of any individual study would change the final outcome, indicating that none of the studies significantly affected the pooled OR and 95% CI.

3.8. Subgroup Analysis. To evaluate the effect of Danshen formulae for different cancers, we did a subgroup analysis. Danshen formulae did not show obvious beneficial effects in gastric cancer (OR 0.90 95% CI 0.06-12.58) and lung cancer (OR 1.81 95% CI 0.98-3.36), while it was good for treatment of leukemia (OR 4.63 95% CI 2.11-10.17) and liver cancer (OR 2.15 95% CI 1.21-3.80). Pooled data indicated that Danshen formulae had beneficial effects during the treatment progress in different cancers (OR 2.38 95% CI 1.66-3.42) (Figure 8).

4. Discussion

4.1. Summary of Evidence. In the past decades, much work has been reported in Chinese Herbal Medicine (HCM) in the treatment of cancer [8–20, 24, 25], and Zhang's review provided evidence for the effectiveness of Danshen in the treatment of cancer [26]. However, there has not been a meta-analysis to study the value of Danshen formulae in cancer treatment. This paper was a systematic review of 13 high-quality RCTs, including 1045 participants, to determine the efficacy and safety of the Danshen formulae for cancer...
Our study showed that the Danshen formulae provide statistically significant benefits in improving RR (OR 2.38, 95% CI 1.66-3.42), 1-year survival (OR 1.70, 95% CI 1.22-2.36), 3-year survival (OR 2.78, 95% CI 1.62-4.78), and 5-year survival rate (OR 8.45, 95% CI 2.53-28.27). Current evidence suggests that Danshen formulae can be used as an effective adjuvant for cancer treatment. Therefore, Chinese medicine practitioners usually use traditional Chinese medicines similar to Danshen root, such as Scutellaria barbata and Hedyotis diffusa in the treatment of cancer [8–20]. It should be mentioned that the current meta-analysis is the first systematic review of the application of Danshen formulae in cancer-assisted treatment. The current meta-analysis found that Danshen formulae can improve the clinical efficiency in cancer treatment. After the addition of Danshen formulae, RR and survival rates were significantly improved. However, it is not clear which components of Danshen formulae have anticancer effects during the treatment, and what role Danshen root plays, which should be the goal of further research.

4.2. Implications for Practice. Modern pharmacological studies were performed on more than 10 tanshinone monomers, including tanshinone I (TNI), tanshinone A (TNIIA), tanshinone B, and cryptotanshinone (CPT), from Danshen root. Tanshinone TNI are the main bioactive components, TNIIA, and implicit tanshinone (CPT); TNIIA activity in salvia miltiorrhiza is the strongest diterpene quinone pigment; TNI and CPT are effective cytotoxic agent and can induce apoptosis and the stagnation of the cell cycle; potential mechanisms involved include raised to promote apoptosis proteins such as p53, Bax, and p21 and inhibit antiapoptotic proteins, including the Bcl-2, survivin, and c-Myc and activated caspase protein to trigger apoptosis, by activating AMP activated protein kinase and extracellular signal regulating kinase (ERK) and suppress the target of pakamycin and 70 kDa ribosomal protein S6 kinase signaling pathways; TNIIA induces autophagic cell death in various cancer cells. Furthermore, TNIIA and TNI can inhibit the migration, invasion, and metastasis of cancer cells by changing the tissue inhibitors of matrix metalloproteinase and/or metalloproteinase [26, 27]. In addition, TNIIA can also promote the differentiation of several cancer cell types and regulate the CCAAT/enhancer binding protein (C/EBP)β and C/EBP homologous protein. Besides, in animal models, the side effects of TNIIA, TNI, and CPT were minimal [28].

In addition, Danshen root also has anti-inflammatory effects. TNIIA inhibits the NF-κB induced kinase/IkappaB alpha kinase (NIK/IKKalpha), while ERKI suppress NF-κB induced by LPS and c-Jun n-terminal kinase (JNK) pathway. The anti-inflammatory effects of TNIIA may be related to the inhibition of the Toll-like receptor (TLR) signaling pathway by TNF receptor-associated factor (TRAF) 2/3/6. TNI significantly inhibits the activity of IIA secreting phospholipase A2 (GIIA), thereby blocking the formation of prostaglandin E2 (PGE2) in LPS-activated macrophages [27, 29]. TNI and CPT also significantly inhibit IL-12 production in LPS-activated macrophages and interferon-γ production in lymphocytes. Recent studies have shown that Salvia miltiorrhiza extract inhibits the production of iNOS and COX-2 by regulating NF-κB and MAPKs, thereby inhibiting the secretion of inflammatory cytokines. In LPS induced RAW264.7 macrophages, salvia miltiorrhiza extract reduced the secretion of nitric oxide (NO), tumor necrosis factor- (TNF-) α, and interleukin 6 (IL-6) and decreased the expression of inducible nitric oxide synthase (iNOS), cyclooxygenase-2 (COX-2), and NF-κB. Moreover, salvia miltiorrhiza extract can significantly inhibit the activation of JNK1/2 and ERK1/2 induced by LPS and disrupt the TLR4 dimerization in LPS-induced RAW264.7 macrophages [29]. Therefore, the anti-inflammatory effect of Danshen root is partly due to the blocking of TLR4 dimerization, which can be used in clinical treatment of liver injury and infection during the anticancer strategies.

4.3. Limitations. All literatures for this meta-analysis were from China, among which 4 were in English and the rest were in Chinese, and only one was multicenter study [10]. Blind methods have been described vaguely in many studies and most of the references were scored 4 points. Moreover, all types of researches were single-center studies with a small
sample size and lack of data support for multicenter, large RCTs. The funnel plot analysis also found obvious asymmetry between the left and the right of funnel plot, therefore, the effect of Danshen formulae in assisting cancer treatment may be exaggerated. In addition to all of the above, the cycle of cancer treatment is extremely long and an army of patients died as their condition worsens during the treatment process, which leads to follow-up work is difficult, resulting in the inability to obtain valid data for many studies, and some literature related to this study cannot be included. Therefore, to better explore the contribution of Danshen formulae in cancer treatment, more large-scale and higher standard studies are needed.

### 4.4. Implications for Further Studies

Nearly 50% of the RCTs included in our study are related to lung cancer, indicating that Danshen formulae may be more widely used in lung cancer. Lung cancer is one of the most dangerous diseases, and it has a variety of treatment options, but the death rate is stubbornly high [2]. Except lung cancer, the included studies also cover leukemia, liver cancer, breast, colon cancer, and gastric cancer, and our study found that 9 kinds of herbs were used in combination with Danshen root in cancer treatment, suggesting that the pharmacological effects of these drugs together may be a mechanism to improve clinical efficacy and reduce side effects. Therefore, this study provides the basis for the clinical treatment and scientific research of Danshen for cancer. In terms of gender ratio, we found that men have a higher risk of cancer than women (605/440), suggesting that men should pour more attention into prevention of cancer, which was also a limitation of this paper, indicating that we should avoid gender selection bias by recruiting women to a certain extent in future studies. By inputting the dose form of Danshen formulae to statistical analysis, we found that there were 1 used granule preparation, 1 used tablet, and the other 11 used decoctions. Ling proved that TCM preparations more safer, effective, and easier to use than decoctions of traditional Chinese medicine [30], and the present study

### Figure 8: The RR analysis of Danshen formulae for different cancers.
showed that the clinical curative effect and dosage forms of CHM were interconnected, interdependent, and mutually reinforcing with each other; drug application shall be familiar with drug characteristics on the premise of fully considering disease characteristics and age constitution and patient and choose the appropriate dosage forms, through the appropriate method to give full play to the effect, and make the drug in patients with optimal clinical curative effect [31, 32]. Therefore, rational selection of drug dosage forms is beneficial to enlighten and create new drugs, which can better promote the further development and research of new dosage forms with higher drug absorption rate. In terms of the treatment of cancer, in traditional western medicine, chemotherapy and radiotherapy are the main treatments for cancer. The purpose of these therapies is to kill or destroy cancer cells. Unfortunately, for most cancer treatments, it is difficult to distinguish between cancer cells and normal healthy cells, which leads to damage to normal cells [33, 34]. The results of this injury are known as complications and side effects of cancer treatment. There were 10 included studies showed that the formulae of Danshen had significant effect in reducing the side effect of vomiting and blood toxicity, which suggested that we could cooperate with the Danshen formulae in the treatment of cancer in the future to reduce the gastrointestinal reaction of patients. The results of subgroup analysis suggested that Danshen formulae might be taken advantage of for cancer treatment. At last, the exact pathologic and clinical pharmacological mechanisms of cancer are still largely unknown and should be studied further.

5. Conclusion

Current findings suggested that Danshen formulae offered statistically significant benefits for cancer, which we generally considered safe. Thus, evidence from the existing study supported the use of Danshen formulae as a treatment for cancer. However, this study was based on several small-sample studies. Therefore, studies with rigorous, large-scale RCTs of Danshen formulae in treating of cancer were needed to further confirm its efficacy.

Consent

The study did not involve human participants and/or animals.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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