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THERAPEUTIC MECHANISMS AND FUNCTIONS OF JUYOUSHEN (JUC) IN GENERAL VAGINITIS: A SYSTEMATIC REVIEW OF 11 CLINICAL MANUSCRIPTS

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ABSTRACT
Vaginitis is a common gynecological disease characterized by vaginal inflammation, abnormal discharge, and pruritus, which seriously affects women's physical and mental health. Conventional treatments such as oral antibiotics, topical antifungals, and traditional Chinese medicine (TCM) lotions have limitations including high recurrence rates, adverse reactions, and poor adherence. Juyoushen (JUC), a long-acting physical antimicrobial material, has shown promising therapeutic effects in clinical practice. This systematic review aimed to comprehensively evaluate the efficacy, safety, and usability of JUC in the treatment of general vaginitis (excluding pregnancy-related cases) using data from 11 Chinese clinical manuscripts. Methods: We extracted and synthesized data from 11 high-quality Chinese clinical studies (6 randomized controlled trials [RCTs] and 5 non-RCTs) involving 987 women with general vaginitis (bacterial vaginosis [BV], vulvovaginal candidiasis [VVC], and mixed infections). Efficacy indicators included total effective rate, cure rate, and recurrence rate; safety was assessed via adverse reaction rates; usability was evaluated by adherence rate and application convenience. Results: JUC's total effective rate (96.8%) and cure rate (84.6%) were significantly higher than conventional treatments (89.7% and 70.2%, respectively; $P < 0.001$). Its recurrence rate (2.1%) was drastically lower than the control group (19.8%, $P < 0.001$). The adverse reaction rate of JUC (0.62%) was significantly lower than conventional treatments (17.9%, $P < 0.001$), with only mild, transient local discomfort reported. JUC also demonstrated superior usability, with a 93%–95% adherence rate. Conclusion: JUC is a safe, effective, and user-friendly treatment for general vaginitis (BV, VVC, mixed infections), with advantages of low recurrence and minimal adverse reactions, worthy of widespread clinical promotion and application.

KEYWORDS: Juyoushen (JUC); Vaginitis; Bacterial Vaginosis; Vulvovaginal Candidiasis; Efficacy; Safety; Usability.

INTRODUCTION
Vaginitis is one of the most common gynecological diseases worldwide, affecting women of all age groups, especially those of reproductive age (Chen et al., 2022; Dai et al., 2019). It is mainly caused by bacterial, fungal, or mixed infections, leading to clinical symptoms such as vaginal pruritus, burning sensation, abnormal discharge, and odor. If not treated promptly or effectively, vaginitis can lead to complications such as pelvic inflammatory disease, infertility, and recurrent infections, seriously affecting women's quality of life and reproductive health (Dang et al., 2011; Liang et al., 2013).

Conventional treatments for general vaginitis primarily include oral antibiotics (e.g., metronidazole, amoxicillin), topical antifungal agents (e.g., clotrimazole, miconazole), and TCM lotions (Liao et al., 2022; Zhang et al., 2020). However, these treatments have significant limitations: oral antibiotics are associated with systemic side effects (e.g., gastrointestinal discomfort, antibiotic resistance) and high recurrence rates; topical antifungals often cause

local irritation and require strict adherence to application procedures; TCM lotions need strict dilution, which is error-prone, and may cause vaginal mucosal damage (Sobel et al., 2019; Yang et al., 2021). Additionally, poor adherence to conventional treatments further reduces therapeutic effects, leading to persistent or recurrent infections.

Juyoushen (JUC), a novel long-acting physical antimicrobial material, exerts its therapeutic effect by forming a positively charged film on the vaginal mucosa, which selectively inactivates pathogens (bacteria, fungi) without systemic absorption or damage to normal vaginal flora (Yang, 2012; Zheng et al., 2011). This unique mechanism avoids the limitations of conventional chemical-based treatments, making it a promising option for general vaginitis. Previous clinical studies have evaluated JUC's efficacy in vaginitis, but most reviews have included pregnancy-related cases, which have special safety requirements and may affect the generalizability of results to the non-pregnant population. This systematic review focuses exclusively on general vaginitis (excluding pregnancy cases), synthesizing data from 11 Chinese clinical manuscripts to comprehensively evaluate JUC's efficacy, safety, and usability, providing high-quality clinical guidance for the treatment of general vaginitis.

METHODS

Study Selection

We included 11 high-quality Chinese clinical studies (6 RCTs and 5 non-RCTs) that evaluated JUC for general vaginitis, excluding all pregnancy-related cases. Inclusion criteria were: (1) study participants were non-pregnant women with confirmed general vaginitis (BV, VVC, or mixed infections), diagnosed based on clinical symptoms and laboratory tests (vaginal secretion smear, fungal culture, or pH test); (2) the intervention group received JUC, and the control group received conventional treatments (oral antibiotics, topical antifungals, or TCM lotions); (3) studies reported at least one of the following outcomes: total effective rate, cure rate, recurrence rate, adverse reaction rate, or adherence rate; (4) studies were published in peer-reviewed Chinese journals with complete data, clear research design, and no duplicate publications. Exclusion criteria were: (1) studies involving pregnant or lactating women; (2) non-clinical studies (e.g., in vitro experiments); (3) studies with incomplete data, high bias risk, or unclear diagnostic criteria.

Data Extraction

Two independent researchers extracted data from the 11 included Chinese manuscripts, including study characteristics (study type, sample size, age of participants, type of vaginitis), intervention details (dosage, treatment course of JUC and conventional treatments), and outcome indicators (total effective rate, cure rate, recurrence rate, adverse reaction rate, adherence rate). Discrepancies between the two researchers were resolved through discussion with a third researcher. All data were verified against the original manuscripts to ensure accuracy.

Outcome Measures

Primary efficacy outcomes: Total effective rate and cure rate. Total effective rate was defined as the proportion of participants with complete resolution (cure) or partial improvement (effective) of clinical symptoms and laboratory indicators. Cure was defined as complete disappearance of clinical symptoms (pruritus, abnormal discharge, odor) and negative laboratory tests (no pathogens detected). Effective was defined as partial improvement of clinical symptoms and reduced pathogen load. Secondary efficacy outcome: Recurrence rate, defined as the proportion of participants with recurrent vaginitis within 1–3 months after treatment completion. Safety outcome: Overall adverse reaction rate, including the type and severity of adverse reactions. Usability outcome: Adherence rate (proportion of participants completing the full treatment course) and application convenience (assessed based on administration frequency, operation complexity, and portability).

Statistical Analysis

Data from the 11 included Chinese manuscripts were systematically verified for consistency prior to synthesis: sample sizes, intervention details (JUC dosage of 3mL once daily for 7 days), and outcome indicators (total effective rate, cure rate, etc.) were cross-checked across all studies to eliminate discrepancies. Descriptive statistics and relative risk (RR) with 95% confidence intervals (CI) were used for synthesizing dichotomous outcomes (total effective rate, cure rate, recurrence rate, adverse reaction rate, adherence rate). Statistical significance was set at $P < 0.05$. Comparative tables were constructed to visualize key outcomes between JUC and conventional treatments, consistent with APA 7 formatting guidelines. All data synthesis and analysis were based on the pooled, consistency-verified results of the 11 Chinese manuscripts (Chen et al., 2022; Dai et al., 2019; Dang et al., 2011).

RESULTS

Study Characteristics

A total of 11 Chinese clinical studies were included, consisting of 6 RCTs and 5 non-RCTs, involving 987 non-pregnant women with general vaginitis (495 in the JUC group and 492 in the control group). The age of participants ranged from 18 to 55 years, with a mean age of 32.6 ± 5.8 years. Among the included studies, 7 focused on BV (n=362/358), 2 on VVC (n=78/76), and 2 on mixed infections (n=55/58). The control group received oral antibiotics (3 studies), topical antifungals (4 studies), or TCM lotions (4 studies). The treatment course for JUC was consistent across all studies: once daily, 3mL per application, for 7 consecutive days. Conventional treatments had varying courses: oral antibiotics (7–10 days, 2–4 times daily), topical

antifungals (7 days, once daily), and TCM lotions (7 days, once daily, with 1:10 dilution).

Efficacy Outcomes

Pooled results from the 11 studies showed that JUC outperformed conventional treatments across all key efficacy indicators ($P < 0.001$).

Table 1: summarizes the primary and secondary efficacy outcomes between JUC and conventional treatments.

Efficacy Indicator	JUC Group (95% CI)	Conventional Treatment Group (95% CI)	RR (95% CI)	P Value
Total Effective Rate	96.8% (95.2%–98.4%)	89.7% (87.1%–92.3%)	1.08 (1.05–1.11)	< 0.001
Cure Rate	84.6% (81.2%–88.0%)	70.2% (66.1%–74.3%)	1.21 (1.14–1.28)	< 0.001
Recurrence Rate (1–3 months)	2.1% (0.8%–3.8%)	19.8% (15.6%–24.0%)	0.11 (0.04–0.26)	< 0.001

Note. RR = Relative Risk; CI = Confidence Interval. JUC group n=495; Conventional treatment group n=492. Data are pooled from 11 included Chinese manuscripts.

Subgroup analyses by type of vaginitis confirmed consistent efficacy of JUC. For BV, JUC's total effective rate was 97.2% (95% CI: 95.5%–98.9%) and cure rate was 85.3% (95% CI: 81.7%–88.9%), significantly higher than conventional treatments (total effective rate 89.9%, cure rate 71.5%; $P < 0.001$). For VVC, JUC's total effective rate was 95.1% (95% CI: 91.0%–99.2%) and cure rate was 82.1% (95% CI: 74.5%–89.7%), higher than topical antifungal treatments (total effective rate 88.2%, cure rate 68.4%; $P < 0.05$). For mixed infections, JUC's total effective rate was 96.4% (95% CI: 92.3%–100.0%) and cure rate was 83.6% (95% CI: 75.2%–92.0%), superior to combined conventional treatments (total effective rate 87.9%, cure rate 67.2%; $P < 0.05$) (Chen et al., 2022; Tan et al., 2013; Zhu et al., 2022).

Safety Outcomes

JUC demonstrated an excellent safety profile, with a significantly lower adverse reaction rate than conventional treatments.

Table 2: compares the safety outcomes of JUC and different types of conventional treatments.

Treatment Type	Adverse Reaction Rate (95% CI)	Common Adverse Reactions	Severity of Adverse Reactions
JUC	0.62% (0.13%–1.48%)	Mild, transient vaginal redness, slight burning sensation	Mild; resolved spontaneously without medical intervention
Oral Antibiotics	16%–31%	Gastrointestinal discomfort (14%–27%), allergic rashes (2%–4%)	Mild to moderate; some required antacids or antihistamines
Topical Antifungals	9%–23%	Local irritation (9%–14%), vulvar edema (4%–9%)	Mild to moderate; some required treatment discontinuation
TCM Lotions	14%–22%	Mucosal burning (14%–19%), mucosal erosion (1%–3%)	Mild to moderate; erosion required medical intervention

Note. TCM = Traditional Chinese Medicine. Data for conventional treatments are pooled from 11 included Chinese manuscripts and relevant literature (Liao et al., 2022; Goyal et al., 2023).

No severe adverse reactions (e.g., severe allergy, vaginal bleeding, pelvic pain) were reported in the JUC group across all 11 studies. In contrast, 2.3% of participants in the conventional treatment group experienced severe adverse reactions (e.g., severe allergic reactions, severe mucosal erosion) that required treatment discontinuation and medical intervention (Dai et al., 2019; Yang et al., 2021). Repeat use of JUC in participants with recurrent vaginitis did not increase the adverse reaction rate (Dang et al., 2011; Zheng et al., 2011).

Usability Outcomes

JUC's ready-to-use spray formulation offered superior usability compared to conventional treatments, with a significantly higher adherence rate.

Table 3: compares the usability features and adherence rates of JUC and conventional treatments.

Treatment Type	Adherence Rate	Administration Frequency	Key Usability Features
JUC	93%–95%	Once daily (3mL/day)	Non-invasive spray, quick-drying (30s), no dilution, room-temperature stable, no post-application rest, portable
Oral Antibiotics	68%–73%	2–4 times daily	Requires water, may cause gastrointestinal discomfort, easy to forget
Topical Antifungals	73%–78%	Once daily	Vaginal insertion, requires 30+ min post-application rest, risk of leakage

TCM Lotions	58%–63%	Once daily	Requires strict dilution (1:10), squatting for application, risk of dilution error

Note. TCM = Traditional Chinese Medicine. Adherence rates are pooled from 11 included Chinese manuscripts (Dang et al., 2011; Wang et al., 2023; Li, 2020).

The main reasons for poor adherence in the conventional treatment group were: complex operation (TCM lotions), frequent administration (oral antibiotics), and discomfort during application (topical antifungals). In contrast, JUC's simple, non-invasive application and once-daily administration significantly improved adherence, which directly contributed to its superior efficacy (Yang et al., 2021; Zhang et al., 2020).

Contraindications

Based on the 11 included manuscripts, JUC had very few contraindications: (1) known hypersensitivity or allergy to JUC or any of its components (organic silicon quaternary ammonium salt, inert excipients); however, no allergic reactions were reported in any of the studies. (2) Severe vaginal mucosal erosion, ulceration, or acute traumatic injury (relative contraindication), as JUC's cationic film may amplify irritation and delay healing; in such cases, mucosal damage should be resolved (e.g., via gentle saline irrigation) before initiating treatment (Liang et al., 2013; Tan et al., 2013). JUC had no age-related contraindications and was safe for use in women of reproductive age and perimenopausal women.

DISCUSSION

This systematic review, based on 11 Chinese clinical manuscripts and excluding pregnancy-related cases, confirms that JUC is a superior treatment for general vaginitis (BV, VVC, mixed infections)—a common gynecological condition affecting women of reproductive and perimenopausal age, characterized by vaginal flora imbalance, pathogen invasion, and clinical symptoms of pruritus, abnormal discharge, and odor. General vaginitis differs from pregnancy-related vaginal infections in that it is not complicated by hormonal changes during pregnancy or fetal safety concerns, and its pathogenesis is mainly driven by routine bacterial/fungal overgrowth, personal hygiene habits, and genital tract microecological disorders. JUC's unique physical antimicrobial mechanism—forming a positively charged film on the vaginal mucosa to selectively inactivate pathogens without systemic absorption—distinguishes it from conventional chemical-based treatments, underpinning its excellent safety and efficacy (Yang, 2012; Zheng et al., 2011). Unlike oral antibiotics, JUC does not cause systemic side effects or antibiotic resistance; unlike topical antifungals and TCM lotions, it does not damage the vaginal mucosa or disrupt the normal vaginal microecology, which is crucial for preventing recurrence of general vaginitis (Dang et al., 2011; Liang et al., 2013).

As shown in Table 1, JUC's total effective rate (96.8%) and cure rate (84.6%) are significantly higher than conventional treatments, while its recurrence rate (2.1%) is only 11% of the control group's recurrence rate. This low recurrence rate addresses a core clinical pain point of general vaginitis: conventional treatments often only alleviate symptoms temporarily but fail to restore the vaginal microecological balance, leading to frequent recurrence that plagues many women. The superior efficacy of JUC is also reflected in its consistent performance across different types of general vaginitis (BV, VVC, mixed infections)—BV is caused by anaerobic bacterial overgrowth, VVC by fungal infection, and mixed infections by combined bacterial-fungal invasion, yet JUC's physical antimicrobial mechanism effectively targets all these pathogens, making it a versatile treatment option for general vaginitis.

Table 2 highlights JUC's exceptional safety profile: its adverse reaction rate (0.62%) is far lower than oral antibiotics (16%–31%), topical antifungals (9%–23%), and TCM lotions (14%–22%). All adverse reactions in the JUC group were mild and transient, resolving spontaneously without medical intervention, which is particularly important for long-term use or repeat treatment in patients with recurrent vaginitis (Chen et al., 2022; Tan et al., 2013). In contrast, conventional treatments often cause moderate adverse reactions that require additional medical management or treatment discontinuation, reducing therapeutic effectiveness.

Usability is another critical strength of JUC, especially for general vaginitis patients who often need convenient, long-term or repeated treatment. General vaginitis patients, unlike pregnant women with mobility limitations, prioritize portability and simplicity of treatment in daily life—JUC's non-invasive spray design, once-daily administration, and ready-to-use formulation eliminate the operational complexity of conventional treatments (e.g., dilution of TCM lotions, vaginal insertion of antifungals) and address the issue of poor adherence (Dang et al., 2011; Wang et al., 2023). The high adherence rate (93%–95%) directly contributes to JUC's superior efficacy, as poor adherence is a major barrier to successful treatment of general vaginitis with conventional therapies—many patients discontinue treatment prematurely due to cumbersome operation or discomfort, leading to persistent or recurrent infections (Yang et al., 2021; Zhang et al., 2020).

This study has several limitations. First, all included studies are Chinese manuscripts, which may limit the generalizability of results to non-Chinese populations. Second, the follow-up period of most studies is relatively short (1–3 months), and long-term recurrence rates and long-term safety outcomes were not evaluated. Third, few studies reported data on the impact of JUC on the vaginal microecology (e.g., lactobacilli recovery rate),

which deserves further investigation. Future research should include large-scale, multi-center RCTs with long-term follow-up, as well as studies in diverse populations, to expand the evidence base for JUC in the treatment of general vaginitis (García-Fernández et al., 2022; Yang et al., 2022).

CONCLUSION

Based on data from 11 Chinese clinical manuscripts, Juyoushen (JUC) is a safe, effective, and user-friendly treatment for general vaginitis (bacterial vaginosis, vulvovaginal candidiasis, and mixed infections). It outperforms conventional treatments in terms of efficacy (higher total effective rate and cure rate, lower recurrence rate), safety (minimal adverse reactions), and usability (higher adherence rate, simpler application). JUC's unique physical antimicrobial mechanism avoids the limitations of conventional treatments, making it a versatile and reliable option for the clinical treatment of general vaginitis. It is worthy of widespread clinical promotion and application to improve the treatment effect and quality of life of women with vaginitis.

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