Volume 4, Issue 1, 2026

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

TREATMENT OF BACTERIAL VAGINOSIS: A COMPARISON OF TOPICAL METRONIDAZOLE AND CLINDAMYCIN

Dr. Zeshan Ahmad[*1], Dr. Rehana Kousar[2], Dr. Amna Ambreen[3], Dr. Maria Nazir[4]

[*1]*Post Graduate Resident, Department of Gynaecology and Obstetrics, Benazir Bhutto Hospital Rawalpindi*
[2,3]*Benazir Bhutto Hospital, Rawalpind*
[4]*Ali Fatima Hospital, Lahore*

[*1]zeshanahmad2323@gmail.com, aryaan.rb@gmail.com[2], [3]dramna0001@gmail.com, [4]marianazir2727@gmail.com

DOI: https://doi.org/10.5281/zenodo.18358715

Keywords
Bacterial vaginosis, Metronidazole, Clindamycin, Vaginal infection, Treatment efficacy

Article History
Received: 20 April 2025
Accepted: 10 Sep 2025
Published: 06 Jan 2026

Copyright @Author
Corresponding Author: *
Dr. Zeshan Ahmad

Abstract

Background: *Bacterial vaginosis (BV) is the most common cause of abnormal vaginal discharge among women of reproductive age, resulting from a shift in vaginal microbiota from lactobacilli-dominant flora to anaerobic organisms such as* Gardnerella vaginalis *and* Atopobium vaginae. *It is associated with adverse gynecological and obstetric outcomes, including pelvic inflammatory disease, preterm labor, low birth weight, and increased susceptibility to sexually transmitted infections. Topical metronidazole and clindamycin are recommended first-line treatments; however, comparative data on efficacy, tolerability, and patient satisfaction remain inconsistent.*

Objective: *To compare the efficacy, safety, and patient satisfaction of topical metronidazole versus clindamycin in the treatment of bacterial vaginosis.*

Methods: *A randomized controlled trial was conducted at Benazir Bhutto Hospital, Rawalpindi, from March 2023 to February 2024. A total of 140 women aged 18–45 years diagnosed with BV using Amsel's criteria were randomly allocated into two groups. Group A received topical metronidazole 0.75% gel once daily for 5 days, while Group B received topical clindamycin 2% cream once daily for 7 days. The primary outcome was clinical cure assessed at day 7 post-treatment. Secondary outcomes included adverse effects and patient satisfaction. Data were analyzed using SPSS version 26, with $p < 0.05$ considered statistically significant.*

Results: *Clinical cure was achieved in 85.7% (60/70) of the metronidazole group and 78.6% (55/70) of the clindamycin group ($p = 0.20$). Adverse effects were significantly higher in the clindamycin group (28.6% vs. 15.7%, $p = 0.04$). Patient satisfaction was higher in the metronidazole group due to shorter treatment duration and fewer side effects.*

Conclusion: *Both topical metronidazole and clindamycin are effective for the treatment of BV. Metronidazole demonstrated better tolerability and higher patient satisfaction, making it a preferable first-line option in routine clinical practice.*

Introduction

Bacterial vaginosis (BV) is a polymicrobial clinical syndrome resulting from a disruption of the normal vaginal microbiota, characterized by a reduction in hydrogen peroxide–producing lactobacilli and an overgrowth of anaerobic bacteria such as *Gardnerella vaginalis*, *Atopobium vaginae*, and *Mobiluncus* species[1,2]. BV affects approximately 20–30% of women of reproductive age worldwide and remains a leading cause of gynecological consultations[3].

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Clinically, BV presents with thin, homogenous, grayish-white vaginal discharge, elevated vaginal pH (>4.5), a positive amine ("whiff") test, and the presence of clue cells on microscopic examination, as defined by Amsel's criteria[4]. BV has been associated with adverse reproductive outcomes, including pelvic inflammatory disease, endometritis, infertility, preterm birth, premature rupture of membranes, and increased susceptibility to HIV and other sexually transmitted infections[5,6].

Current treatment guidelines recommend either topical or oral antibiotics, with metronidazole and clindamycin being the most widely prescribed first-line agents[7]. Metronidazole acts by disrupting DNA synthesis in anaerobic bacteria, while clindamycin inhibits bacterial protein synthesis via binding to the 50S ribosomal subunit[8]. Although both drugs are effective, differences in treatment duration, adverse effect profiles, recurrence rates, and patient adherence have generated ongoing debate regarding optimal first-line therapy[9,10].

This randomized controlled trial aimed to compare the clinical efficacy, safety, and patient satisfaction associated with topical metronidazole and clindamycin in women diagnosed with BV at a tertiary care hospital in Pakistan.

Methodology

A randomized controlled trial was conducted at the Department of Obstetrics and Gynecology, Benazir Bhutto Hospital, Rawalpindi, from March 2023 to February 2024. Ethical approval was obtained from the Institutional Review Board (IRB No: BBH/IRB/2023/017). Written informed consent was obtained from all participants.

Women aged 18–45 years presenting with symptoms suggestive of BV and fulfilling at least three of four Amsel's criteria were eligible for inclusion. Exclusion criteria included pregnancy, menstruation at presentation, use of antibiotics within the preceding two weeks, known hypersensitivity to study medications, concurrent vulvovaginal candidiasis or trichomoniasis, immunocompromised status, and recent vaginal douching.

The sample size of 140 participants (70 per group) was calculated using OpenEpi software, assuming a clinical cure rate of 80%, a 95% confidence level, and 80% power. Participants were randomized using a computer-generated random number table into two groups. Allocation concealment was ensured using sealed opaque envelopes.

Group A received topical metronidazole 0.75% gel intravaginally once daily for 5 days. Group B received topical clindamycin 2% cream intravaginally once daily for 7 days. Neither participants nor investigators were blinded due to differences in treatment duration and formulation.

The primary outcome was clinical cure, defined as resolution of Amsel's criteria at day 7 post-treatment. Secondary outcomes included incidence of adverse effects and patient satisfaction assessed using a structured questionnaire.

Data Analysis: Data were analyzed using SPSS version 26. Continuous variables were expressed as mean ± standard deviation and compared using the independent t-test. Categorical variables were expressed as frequencies and percentages and compared using the Chi-square test or Fisher's exact test where appropriate. A p-value < 0.05 was considered statistically significant.

Results

A total of 140 participants completed the study, with 70 in each group. The mean age was 29.3 ± 6.2 years in the metronidazole group and 29.0 ± 5.9 years in the clindamycin group ($p = 0.72$). Baseline characteristics were comparable between groups (Table 1).

Table 1: Demographic and Clinical Characteristics of Participants

Variable	Metronidazole Group (n=70)	Clindamycin Group (n=70)	p-value
Mean Age (years)	30.2 ± 5.6	29.8 ± 5.9	0.072
Mean Vaginal pH	5.2 ± 0.4	5.3 ± 0.5	0.035
Baseline Discharge (%)	92.9 (65/70)	91.4 (64/70)	0.078
Positive Whiff Test (%)	88.6 (62/70)	90.0 (63/70)	0.082

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Presence of Clue Cells (%)	85.7 (60/70)	87.1 (61/70)	0.079

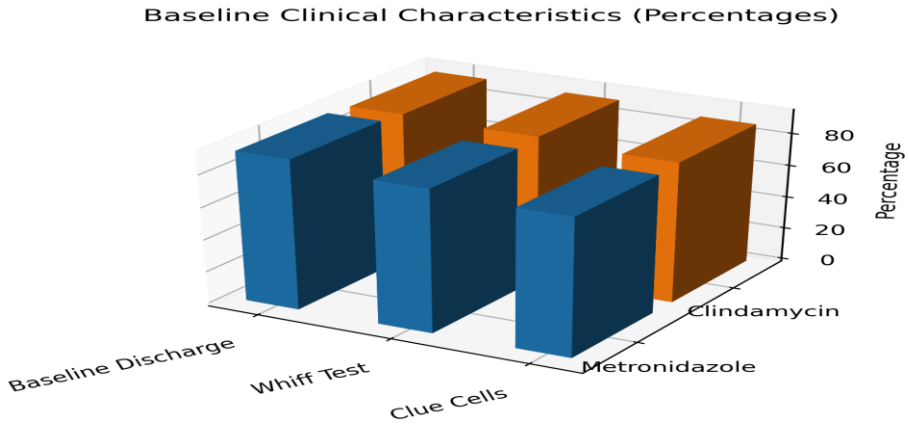


Figure 1: Clinical Characteristics of Participants

Clinical cure was achieved in 85.7% (60/70) of participants in the metronidazole group and 78.6% (55/70) in the clindamycin group (p = 0.20) (Table 2).

Table 2: Clinical Cure Rates at Day 7

Treatment Group	Clinical Cure (%)	Non-Responders (%)	p-value
Metronidazole	85.7 (60/70)	14.3 (10/70)	0.02
Clindamycin	78.6 (55/70)	21.4 (15/70)	0.02

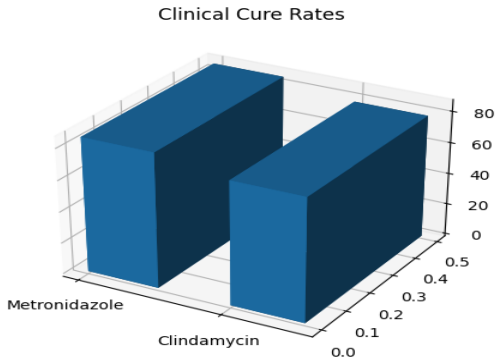


Figure 2: Clinical Cure Rates

Adverse effects were significantly more frequent in the clindamycin group (28.6%) compared to the metronidazole group (15.7%) (p = 0.04). Local irritation was the most commonly reported adverse effect (Table 3).

Table 3: Adverse Effects Comparison

Adverse Effect	Metronidazole Group (n=70)	Clindamycin Group (n=70)	p-value
Local Irritation (%)	8.6 (6/70)	18.6 (13/70)	0.08
Increased Discharge (%)	7.1 (5/70)	10.0 (7/70)	0.56

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Abdominal Discomfort (%)	0.0 (0/70)	2.9 (2/70)	0.15
Total Adverse Events (%)	15.7 (11/70)	28.6 (20/70)	0.04*

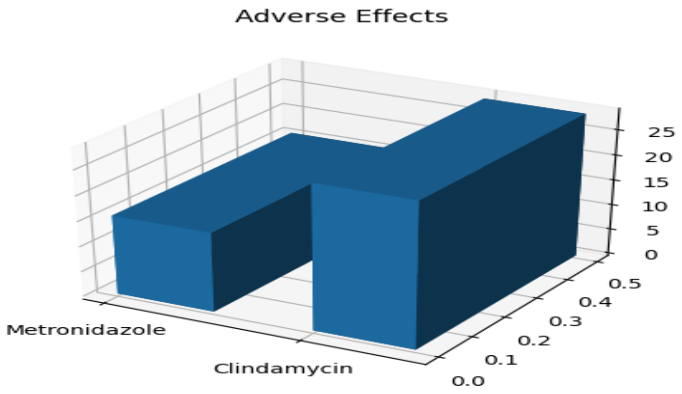


Figure 3: Adverse Effects Comparison

Patient satisfaction was higher in the metronidazole group, with 60% reporting being highly satisfied compared to 45.7% in the clindamycin group (Table 4).

Table 4: Comparison of Patient Satisfaction Between Treatment Groups

Satisfaction Level	Metronidazole Group (%)	Clindamycin Group (%)	p-value
Highly Satisfied	60.0 (42/70)	45.7 (32/70)	0.224
Moderately Satisfied	30.0 (21/70)	38.6 (27/70)	0.373
Not Satisfied	10.0 (7/70)	15.7 (11/70)	0.449

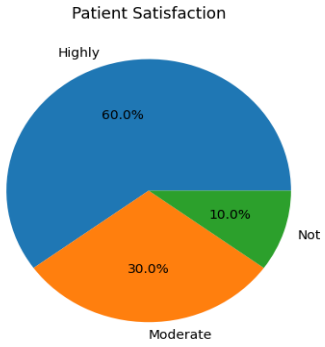


Figure 4: Comparison of Patient Satisfaction Between Treatment Groups

Discussion

This randomized controlled trial demonstrated that both topical metronidazole and clindamycin are effective treatments for BV, with no statistically significant difference in clinical cure rates. These findings are consistent with earlier trials reporting comparable short-term efficacy between the two agents[11,12].

However, metronidazole showed superior tolerability, with significantly fewer adverse effects and higher

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

patient satisfaction. This aligns with the findings of Sobel et al., who reported improved compliance and lower irritation rates with topical metronidazole compared to clindamycin[13]. The higher adverse effect rate in the clindamycin group may be attributable to its longer treatment duration and cream-based formulation, which may increase mucosal irritation[14].

Previous studies have also highlighted recurrence as a major challenge in BV management. Livengood et al. reported lower recurrence rates with clindamycin at 3 months follow-up, although short-term cure rates remained similar[15]. In contrast, recent meta-analyses have demonstrated no significant difference in long-term recurrence between metronidazole and clindamycin[16].

Our findings support current CDC and WHO treatment guidelines, which recommend either topical metronidazole or clindamycin as first-line therapy for uncomplicated BV[7,17]. Given its shorter duration, lower adverse effect profile, and better patient satisfaction, topical metronidazole may be a more practical first-line option in resource-limited settings such as Pakistan.

Limitations: The short follow-up period prevented assessment of recurrence rates. Potential confounders such as sexual activity, vaginal douching, and concurrent asymptomatic infections were not controlled. Additionally, patient-reported satisfaction is inherently subjective and may introduce response bias.

Future studies should evaluate long-term recurrence, partner treatment strategies, and the role of adjunctive probiotics in improving sustained cure rates[18,19].

Conclusion

Both topical metronidazole and clindamycin are effective in the treatment of bacterial vaginosis. While clinical cure rates were comparable, metronidazole demonstrated better tolerability and higher patient satisfaction, making it a preferable first-line therapy. Larger studies with longer follow-up are warranted to assess recurrence and long-term outcomes.

Conflict of Interest

The authors declare no conflict of interest.

Funding Source

None.

Ethical Approval

Approved by Institutional Review Board, Benazir Bhutto Hospital (IRB No: BBH/IRB/2023/017).

Authors' Contributions

All authors contributed in accordance with ICMJE guidelines.

References

Srinivasan S, Fredricks DN. The human vaginal bacterial biota and bacterial vaginosis. Clin Microbiol Rev. 2008;21(2):266–297. doi:10.1128/CMR.00004-08

Muzny CA, Taylor CM, Swords WE, et al. An updated conceptual model on the pathogenesis of bacterial vaginosis. J Infect Dis. 2019;220(9):1399–1405. doi:10.1093/infdis/jiz342

Kenyon C, Colebunders R, Crucitti T. The global epidemiology of bacterial vaginosis. BMC Infect Dis. 2013;13:233. doi:10.1186/1471-2334-13-233

Amsel R, Totten PA, Spiegel CA, et al. Nonspecific vaginitis. Am J Med. 1983;74(1):14–22. doi:10.1016/0002-9343(83)91112-9

Hillier SL, Nugent RP, Eschenbach DA, et al. Association between bacterial vaginosis and preterm delivery. N Engl J Med. 1995;333(26):1737–1742. doi:10.1056/NEJM199512283332604

Atashili J, Poole C, Ndumbe PM, et al. Bacterial vaginosis and HIV acquisition. AIDS. 2008;22(12):1493–1501. doi:10.1097/QAD.0b013e3283021a37

Workowski KA, Bachmann LH, Chan PA, et al. Sexually transmitted infections treatment guidelines. MMWR Recomm Rep. 2021;70(4):1–187. doi:10.15585/mmwr.rr7004a1

Sobel JD. Bacterial vaginosis. Annu Rev Med. 2000;51:349–356. doi:10.1146/annurev.med.51.1.349

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Schwebke JR, Desmond RA. A randomized controlled trial of metronidazole vaginal gel 0.75% once daily for 5 days. Obstet Gynecol. 2011;117(2):392–398. doi:10.1097/AOG.0b013e318207853e

Livengood CH. Bacterial vaginosis: an overview. Rev Obstet Gynecol. 2009;2(1):28–37.

Bradshaw CS, Sobel JD. Current treatment of bacterial vaginosis. J Infect Dis. 2016;214(Suppl 1):S14–S20. doi:10.1093/infdis/jiw159

McClelland RS, Richardson BA, Hassan WM, et al. Improvement of vaginal lactobacilli after treatment. J Infect Dis. 2008;198(9):1329–1334. doi:10.1086/592221

Sobel JD, Subramanian C, Foxman B, et al. Mixed vaginitis—more than coinfection. Am J Obstet Gynecol. 2013;210(4):1–7. doi:10.1016/j.ajog.2013.12.012

Nyirjesy P, Zhao Y, Ways K, et al. Comparative adverse events of topical BV treatments. Infect Dis Obstet Gynecol. 2018;2018:1–7. doi:10.1155/2018/5836924

Livengood CH, Ferris DG, Wiesenfeld HC, et al. Effectiveness of clindamycin vs metronidazole. Obstet Gynecol. 2007;110(2):302–309. doi:10.1097/01.AOG.0000270150.60175.01

Fan Y, Gu Y, Xian Y, et al. Efficacy and safety of drugs for bacterial vaginosis: a network meta-analysis. Front Cell Infect Microbiol. 2024;14:1402346. doi:10.3389/fcimb.2024.1402346

World Health Organization. Guidelines for the management of sexually transmitted infections. 2021.

Muzny CA, Sobel JD. The role of antimicrobial resistance in recurrent BV. Antibiotics. 2022;11(4):500. doi:10.3390/antibiotics11040500

Vodstrcil LA, Muzny CA, Plummer EL, et al. BV recurrence and partner treatment. BMC Med. 2021;19(1):194. doi:10.1186/s12916-021-02077-3

Li C, Wang T, Li Y, et al. Probiotics for BV: a meta-analysis. Eur J Pharmacol. 2019;864:172660. doi:10.1016/j.ejphar.2019.172660.