Spring 2024

Probiotic Therapy for the Treatment and Prevention of Bacterial Vaginosis

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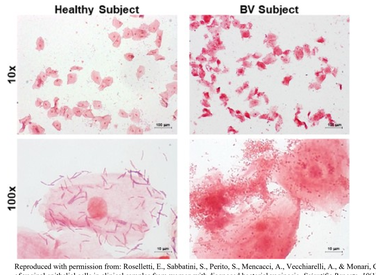
Abstract

Bacterial vaginosis (BV) is a common presenting complaint in healthcare, and patients often experience recurrences at a frustrating rate. The mainstay of current treatment is antibiotic therapy, either via oral or vaginal route. When recurrences occur, stronger antibiotics are often employed. This current method of treatment does not address an underlying component that impacts infection recurrence and rate of recurrence- the patient's baseline vaginal microbiome and the healthy bacteria that support it. To investigate the use of probiotics in bacterial vaginosis treatment, a comprehensive literature review was completed using databases PubMed and Embase.

The results of this literature review confirm that probiotic therapy is safe for the treatment of BV. There are a variety of different probiotic bacterial strains and concentrations utilized for either monotherapy to treat BV or in conjunction with antibiotic therapy. Of the bacterial strains analyzed, those that were most studied were *L. crispatus* and *L.rhamnosus* via both oral and vaginal use. Both oral route and vaginal route of probiotic treatment were shown to be effective. Vaginal route showed a faster impact on microbiome, but also a faster rate of recurrence than oral probiotic use. Probiotic therapy alone or in conjunction with antibiotics was found to be more effective than placebo or the use of only antibiotics to treat BV. Further research is still needed regarding identifying all possible bacterial strains that are beneficial in treating/preventing BV, differing combinations of strains for increasing efficacy, along with identifying the necessary concentrations of these strains.

Key Words: vaginal diseases, vaginal infections, vaginitis, vaginal discharge, vaginal microbiome, probiotics

Introduction



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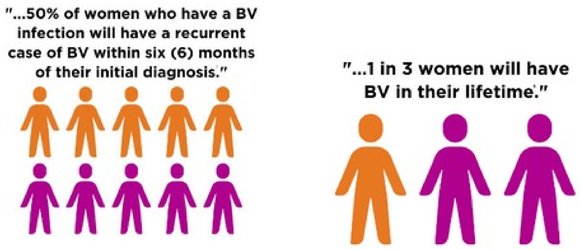
Bacterial vaginosis (BV) infection is the most common vaginal condition in women ages fourteen to forty-four (Koumans et al. 2007). BV is an imbalance of good and bad bacteria in the vagina that can lead to patient symptoms of itching, burning, and foul odor (Mayo Clinic, 2023). Most often this imbalance involves an increase in "bad" bacteria (*Gardnerella vaginalis*) and a decrease in "good bacteria" *(Lactobacillus* strains). This imbalance can also place women at increased risk for other issues, including sexually transmitted infections, pelvic inflammatory disease, and complications with pregnancy (Mayo Clinic, 2023). BV is often diagnosed by Nugent score, Amsel criteria, patient symptoms, or a combination of these.

Human microbiome research, along with how probiotics can be utilized for treatment of conditions with underlying bacterial dysbiosis has been an area of exponential growth over the past five decades (Puebla-Barrigan & Reid, 2019). The definition of probiotic was determined by the World Health Organization (WHO) and the United Nations Food and Agriculture Organization as "live microorganisms which when administered in adequate amounts confer a health benefit on the host" (FAO/WHO, 2001). This literature review aims to evaluate whether probiotic therapy is safe and beneficial for women who suffer from BV infections. The analysis also aims to determine whether oral or vaginal route of administration is superior, and whether probiotic monotherapy or probiotic therapy in conjunction with typical antibiotic therapy has a higher cure rate and longer time to relapse.

Statement of the Problem

Women who are diagnosed with a BV infection seem predisposed to developing recurrent issues with BV infections. According to Bradshaw et al. (2006), within the first year after antibiotic treatment with either metronidazole or clindamycin for BV 50-80% of women have a recurrence. Current methods of treatment for BV focus solely on treatment with antibiotics to eradicate harmful bacterial overgrowth. While initially effective, this method does not address the need for the vaginal microbiome to be re-established with healthy levels of bacteria, namely *Lactobacillus* species that keep the vaginal mucosa pH low and prevent infection reoccurrence. This leads to a shorter time to relapse than would be expected. Probiotic research is investigating the proper strain(s), concentration(s), route of administration, and duration of treatment to help reduce BV recurrence.



Reproduced with permission from Pelly, J. (2022, September 8). *Finally, an OTC BV treatment is available.* FemiClear. https://femiclear.com/blogs/learning-hub/over-the-counter-product-for-the-treatment-of-bv

Research Question

In reproductive-age women with bacterial vaginosis (BV), is probiotic therapy a safe and effective treatment for preventing recurrence?

Literature Review

Oral probiotic monotherapy

•Vujic et al. (2013) found that probiotic therapy with *L. rhamnosus* and *L. rheuteri* resulted in 61.5% of women becoming BV free. This was the largest sample size of studies analyzed at 544 women, but included those with vaginal infections other than BV.

•Mandar et al. (2023) used 2 strains of *L. crispatus* in their study and found that the Nugent scores decreased by an average of 2.3 points via oral probiotic administration.

Oral probiotic therapy with initial antibiotic treatment

•Hecsko et al. (2015) found that time to BV recurrence was prolonged by an extra 24.1 days compared to placebo when treating with *L. gasseri, L. fermentum,* and *L. plantarum.*

•The combination of *L.crispatus, L.gasseri, L. rhamnosus,* and *L. jensenii* resulted in 35.3% more women becoming BV free than placebo (Laue et al. 2018.)

Vaginal suppository probiotic monotherapy

•The above mentioned study conducted by Mandar et al. in 2023 decreased Nugent score by an average of 2.3 points when participants were treated with two strains of *L. crispatus* via vaginal probiotic administration.

•*L. fermentum* and *L. plantarum* treatment reduced BV by 73.3% compared to placebo in a study conducted by Vicariotto et al. (2014). This was the largest reduction noted in the studies analyzed, but included tara gum in the base which may have created a mechanical barrier to *Gardnerella* bacteria.

Vaginal suppository probiotic therapy with initial antibiotic treatment

•Bohbot et al. (2018) found that treatment with *L. crispatus* reduced BV by 22.7% and increased time to recurrence by 24.6 days compared to placebo.

•The study with the longest treatment period (32 weeks) was Recine et al. (2015) which utilized *L. rhamnosus.* This study showed a 70.4% reduction in BV compared to placebo.

Discussion

General Outcomes

•All of the studies analyzed found probiotics to be safe to use.

•All studies analyzed also found that the use of probiotics helped reduce BV recurrence.

•The analysis of data in this review shows that probiotic use resulted in 78.4% of women BV free at the end of the treatment period versus 39.7% of women who used placebo (see figure below).

Vaccine/Concentration

•Due to the difficult construct

Route of administration

•Overall, studies that analyzed

•Studies analyzing vaginal sub

•Lactal administration alone

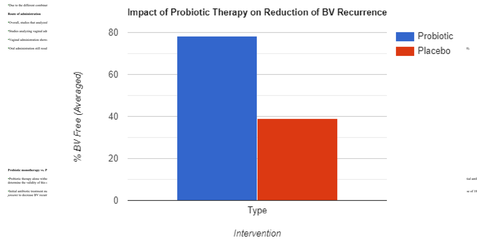
•Oral administration with vaginal

Probiotic monotherapy vs. P

•Probiotic therapy alone redu decreases the viability of these

•Initial antibiotic treatment m proven to decrease BV recurr

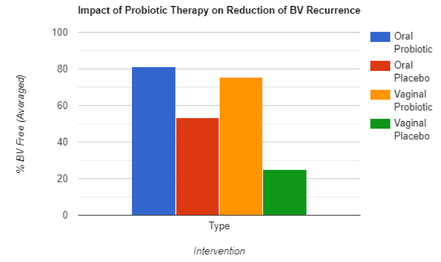
Figure 1



tial antibiotic treatment, as further research should be completed to

se of 10.4 million (Scal' L. crispatus, L. gasseri, L. rhamnosus, and L

Figure 2



Applicability to Clinical Practice

With the information provided from this literary review, healthcare providers should consider using shared decision-making to determine if Probiotic therapy is an appropriate monotherapy or adjunctive therapy to traditional treatment methods for BV infections.

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When initiating the use of probiotics for vaginal health-

•Patients should be advised to select a probiotic with a high concentration per serving (billions)

•The selected probiotic should include strains that are supported by research to colonize the vaginal mucosa and survive the gastrointestinal tract (for orally administered). Examples of effective strains are *L. crispatus, L. rhamnosus, L. rheuteri, L. gasseri, L. fermentum,* and *L. plantarum.*

•Type of product/route of administration can be left up to patient preference (oral pill vs. vaginal suppository) as both are supported by clinical research data and have been shown to be effective

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Acknowledgements

I would like to thank my advisor and Professor Julie Solberg for her excellent guidance, continuous patience, and imparted wisdom throughout the development of this scholarly project. I would like to thank Megan Denis, MLIS at the University of North Dakota's Library Resources for dedicating her time and expertise in guiding this research, and to Dr. Marilyn Klug for her recommendations in the statistical analysis of the contents of this literature review. A thank you to Kayli Day, PA-S for her continuous encouragement, unwavering support, and much-appreciated humor throughout this academic program. Lastly, I would like to extend my heartfelt gratitude to my family and friends, for their selfless contributions and sacrifices that have enabled me the freedom to pursue my career aspiration of becoming a Physician Assistant.