Clinical and Experimental Health Sciences

Mediterranean Diet as an Adjunct Therapy in Bacterial Vaginosis Treatment: A Randomized Controlled Trial

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ABSTRACT

Objective: Vaginitis is a common and treatable condition in women. However, bacterial vaginosis (BV) may be resistant to treatment despite the use of antibiotics. This study aimed to determine the effect of the Mediterranean diet on the treatment of BV.

Methods: This randomized controlled trial was designed to investigate the impact of the Mediterranean diet on BV treatment. Demographic data, body mass index (BMI), menopausal status, presence of diabetes mellitus, medical history, average three-day food intake, and treatment outcomes during follow-up examinations were recorded. Patients who were advised to follow the Mediterranean diet and adhered to it (Group 1) were compared with those in the control group who did not follow a dietary intervention (Group 2). Additionally, patients were categorized based on the persistence of BV following treatment.

Results: The study included 64 patients who were advised to follow the Mediterranean diet and complied with it, and 64 patients who received no dietary recommendation. The mean age of participants was 49.32 ± 10.53 years. The treatment-resistant group had higher rates of elevated BMI (>30 kg/m²), history of vaginal surgery, history of vaginitis, and non-adherence to the Mediterranean diet compared to the treatment-responsive group ($p < .05$). Multivariate analysis revealed that high BMI (≥30), diabetes mellitus, recurrent vaginitis, and not adhering to the Mediterranean diet were statistically significant risk factors for treatment-resistant vaginitis.

Conclusion: The Mediterranean diet enhances the effectiveness of BV treatment. High BMI, diabetes mellitus, and a history of recurrent vaginitis are significant risk factors for treatment-resistant bacterial vaginosis.

Keywords: Bacterial vaginosis, treatment, Mediterranean diet

1. INTRODUCTION

Vaginosis is a highly prevalent condition among women. It encompasses a range of disorders that cause distressing vaginal symptoms such as burning, itching, abnormal discharge, unpleasant odor, dryness, and dyspareunia [1–4]. The causes of vaginosis include fungal, bacterial, and protozoal infections, chemical irritants, medications, tumors, and hormonal changes [5,6]. Different types of vaginosis occur depending on the causative agent, with bacterial vaginosis (BV) being one of the most common. BV is estimated to account for 10–30% of vaginal infections, affecting approximately 13 million women globally [7–10]. If left untreated, BV can lead to serious health complications, including cervical and ovarian cancers, infertility, chronic pelvic pain, and ectopic pregnancy [10].

Previous research has demonstrated a relationship between dietary habits and the development of BV [12–14]. Risk factors for vaginitis include obesity, physical inactivity, consumption of sugary and acidic beverages, excessive alcohol intake, insufficient vitamin C, stress, sleep disturbances, and antibiotic use [15]. Diet plays a critical role in vaginal health. High intake of fruits and vegetables increases dietary fiber and supplies non-digestible oligosaccharides, prebiotics, and other functional carbohydrates that support intestinal and vaginal health [16,17]. Functional foods, probiotics, and prebiotics have also been shown to help treat vaginal inflammation.

Micronutrient deficiencies—particularly in vitamins A, C, D, E, and beta-carotene—can increase susceptibility to BV and

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often reflect inadequate fruit and vegetable consumption. Recently, researchers have found that nutrient-dense diets significantly reduce the likelihood of bacterial infections. Regular consumption of fresh fruits and vegetables is associated with a reduced risk of vaginitis [18]. Betaine, found in vegetables like spinach, has also been linked to vaginal health; reduced betaine intake correlates with an increased risk of molecular-BV, according to Tuddenham et al. [19]. Moreover, high consumption of refined sugar has been shown to negatively impact vaginal health, increasing vulnerability to fungal infections. A balanced diet—rich in fresh vegetables and fruits, and low in processed and sugary foods—is recommended for maintaining vaginal health [20–22].

The Mediterranean diet (MD), characterized by high consumption of fruits, vegetables, whole grains, legumes, fish, and low intake of processed foods, is considered a model of healthy eating. Women's health is a cornerstone of development, particularly in low – and middle-income countries [21]. The human microbiota, which is closely influenced by dietary patterns, plays a crucial role in health and disease. Studies across diverse populations show that strong adherence to the MD correlates with reduced incidence of chronic conditions such as cancer, metabolic syndrome, cardiovascular and neurodegenerative diseases, type 2 diabetes, non-alcoholic fatty liver disease, and allergies [23]. Furthermore, MD adherence is associated with improved quality of life, psychological well-being, and metabolic health [24].

In recent years, improved dietary habits have been linked to declining gastric cancer rates worldwide. For instance, in Southern Italy—where the MD is prevalent—and other Mediterranean countries like France and Greece, cancer mortality rates are lower than in Northern Italy and other non-Mediterranean regions, although the exact reasons for this remain under investigation [25].

While BV is commonly treated with vaginal tablets, creams, antibiotics, and antiparasitic drugs, these treatments are not always effective [26]. Therefore, incorporating nutritional therapy alongside medical treatment could provide greater benefits. This study aimed to evaluate the impact of the Mediterranean diet as a complementary intervention to standard medical treatment in patients diagnosed with vaginitis.

2. METHODS

A randomized controlled study was designed to investigate the effect of the Mediterranean diet on the treatment of vaginitis in patients diagnosed with BV and receiving medical treatment. The study was carried out in collaboration between the Gynecology and Obstetrics Clinic and the Diet Clinic. The patient group with bacterial vaginosis was randomly divided into two: diet and control groups (Figure 1).

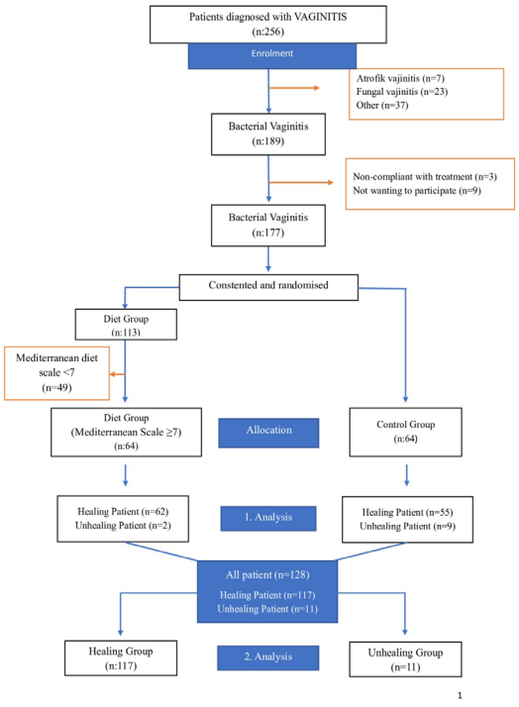

Figure 1: *Patient Selection*

The inclusion criteria for the study were; having been diagnosed with vaginitis, agreeing to participate in the study, not having used antibiotics or probiotics in the last 3 months, not being pregnant or breastfeeding. Individuals with mental illness, special diet, immune system diseases and those who had given birth in the last 6 months were excluded from the study. Patients (n=256) diagnosed with BV (n=189) and receiving medical treatment were randomly divided into two groups: diet and control. Medical treatment was administered to both groups. Excluded from the study were: 7 patients with vaginal atrophy, 23 with fungal vaginitis, 37 with different diagnoses upon symptom examination, 3 who discontinued treatment after study initiation, and 9 who withdrew voluntarily (Figure 1). Patients in the diet group were those who had been diagnosed with BV, received medical treatment, were recommended a Mediterranean diet, adhered to it based on the Mediterranean Diet Adherence Questionnaire, and returned for a follow-up visit after two weeks. Control group patients were those who had been diagnosed with BV, received medical treatment, and returned for a follow-up visit but were not given any dietary recommendations. After the control visit, patients were classified as either successfully or unsuccessfully treated and compared accordingly.

Patients' sociodemographic data (age, gender, marital status, duration of education, and employment status) were recorded. Educational status was grouped based on duration (≤12 and >12 years), and employment status was categorized as employed or unemployed. The Mediterranean diet has no time limit and is considered a lifestyle. Its effects typically begin two weeks after initiation, lowering the inflammatory index of the diet [27]. For this reason, a re-evaluation was

performed after two weeks of dietary intervention. This study was conducted in accordance with the Declaration of Helsinki and was approved by the Osmaniye Korkut Ata University Science, Scientific Research, and Publication Ethics Committee (Approval Number: 2022/8/1). Written informed consent was obtained from all participants. The study is registered at https://clinicaltrials.gov/ with the identifier NCT05828498.

2.1. Recommended Diet Protocol

The total energy needs of randomly selected participants were calculated by a dietitian using the Harris-Benedict method [28], and a personalized Mediterranean diet plan was created. Only individuals not on any prior diet were included. Those who had dieted in the past year or were currently on a diet were excluded. The diet plan was followed for two weeks and tailored to individual eating habits. Meals were distributed across breakfast, lunch, dinner, and two snacks. While meal frequency could be adjusted based on individual preferences, the diet pattern and caloric intake remained constant. The control group received only medical treatment, without any dietary guidance.

The traditional Mediterranean diet emphasizes plant-based foods (fruits, vegetables, whole grains, legumes, nuts, and seeds); minimally processed, seasonal, and locally grown ingredients; fresh fruit for dessert; moderate consumption of dairy (mainly cheese and yogurt); 0–4 eggs per week; low to moderate fish and poultry; limited red meat; and moderate wine consumption with meals [26] (Figure 2). The MD is rich in antioxidants such as beta-carotene, vitamins B, C, and E, folic acid, polyphenols, and other phytochemicals. It has been extensively studied for its role in chronic disease prevention and management [29]. The diet plan was thoroughly explained to participants.

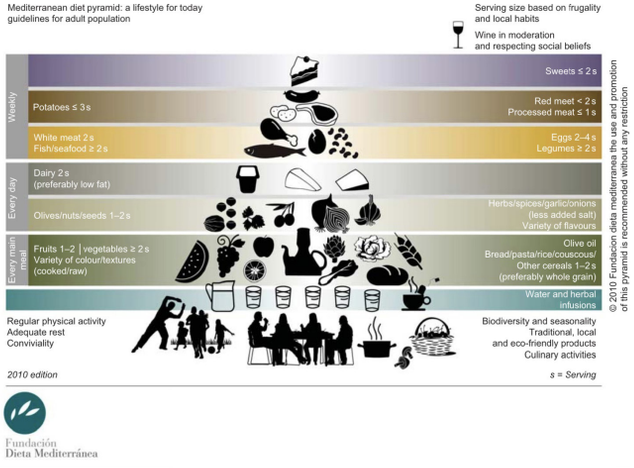

Figure 2: *The Mediterranean diet pyramid [18].*

2.2. *Data Collection*

Demographic data (age, gender), anthropometric measurements, presence of comorbid diseases, menopausal status, diabetes mellitus (DM), medical history, average three-day food intake (2 weekdays, 1 weekend), and treatment outcomes were recorded. Additional information regarding birth history, delivery method, vaginal surgery, and history of vaginitis was obtained.

2.3. Anthropometric Measurements

Body weight (kg), height (cm), and total body and abdominal fat percentages were measured. Weight was assessed using a 100g-sensitive standard scale, and height was measured using a Harpenden Stadiometer. BMI was calculated using the formula: weight/height². Body composition was assessed using the Tanita device, which measures fat, muscle mass, and fat-free mass across five regions via bioelectrical impedance analysis (BIA). Obesity was defined as BMI ≥30 kg/m² according to WHO standards [30].

2.4. Nutrient Consumption Analysis

Patients were instructed to keep a food diary before their follow-up visit. To ensure accuracy, visual aids of portion sizes (e.g., tea glass, bowl, spoon sizes) were provided. Data from food diaries were analyzed using the BEBIS software. Daily energy intake (kcal), macronutrient distribution, and fiber intake were calculated, and protein sources were categorized as animal or plant-based. The frequency of vegetable, fruit, and grain consumption was recorded.

2.5. Mediterranean Diet Compliance Questionnaire

Adherence to the Mediterranean diet was assessed using the Mediterranean Diet Adherence Scale. This 14-question tool evaluates aspects such as type and amount of oil, frequency of fruit and vegetable intake, red meat, wine, legumes, fish, nuts, and olive oil-based tomato sauce consumption. Each question is scored 0 or 1 based on consumption. A score >7 was considered indicative of good adherence and used to determine inclusion in the diet group [31].

2.6. Diagnosis and Treatment of Bacterial Vaginitis

BV diagnosis was made by an obstetrician-gynecologist. When needed, diagnosis was confirmed via vaginal culture and microbiological testing. Treatment was administered using oral or vaginal antibiotics (metronidazole or clindamycin), based on physician preference.

2.7. Power Analysis

A clinically significant difference was assumed to be half a standard deviation (Cohen's d) between patients on and off the Mediterranean diet. Based on a power of 0.80 and a Type I error of 0.05, the required sample size per group was 64. Sample size calculation was performed using G*Power.

2.8. Ethics Committee Approval

The study protocol was reviewed and approved by the Scientific Research and Publication Ethics Committee of Osmaniye Korkut Ata University (Decision Number: 2022/8/1-168). Written informed consent was obtained from all participants prior to inclusion in the study.

2.9. Statistical Analysis

Continuous data were presented as mean ± standard deviation; ordinal data as median with minimum and maximum values; and categorical data as frequencies and percentages. Student's t-test and Mann–Whitney U test were used for comparisons between two independent groups. The Chi-square test assessed relationships between categorical variables. Logistic regression analysis with backward and enter methods was conducted to evaluate treatment-resistant vaginitis risk. A p-value <.05 was considered statistically significant. Analyses were performed using MedCalc and www.e-picos.com.

3. RESULTS

In total, 256 patients were diagnosed with vaginitis in the Obstetrics and Gynecology Clinic. Of these, bacterial vaginosis (BV) was identified in 189 patients (73.8%). Twelve patients with BV declined participation and were therefore excluded from the study. Among the remaining 177 patients, 113 were provided with counseling regarding the Mediterranean diet. Of these, 49 patients (42.5%) were excluded due to a Mediterranean Diet Adherence Scale (MDAS) score below 7. The remaining 64 patients (57.5%) who adhered to the Mediterranean diet (MDAS ≥ 7) were included in the dietary intervention group (Group 1). The control group (Group 2) consisted of 64 patients who received standard medical treatment without any dietary intervention.

All participants were female, with a mean age of 49.32 ± 10.53 years. In terms of marital status, 39 patients (30.5%) were single and 89 (69.5%) were married. Educational attainment was ≤12 years in 76 patients (59.4%) and >12 years in 52 patients (40.6%). Employment status was nearly balanced, with 67 patients (52.3%) employed and 61 (47.7%) unemployed. There were no statistically significant differences between the two groups in terms of age, marital status, educational level, or employment status (p>.05).

Demographic and clinical characteristics are presented in Table 1 and 2. There were no statistically significant differences between the groups regarding age, body mass index (BMI), total body fat percentage, abdominal fat percentage, menopausal status, presence of diabetes mellitus (DM), obstetric history, delivery method, history of vaginal surgery, or previous episodes of vaginitis (p>.05).

Nutritional analysis revealed that the mean daily energy intake was significantly lower in Group 1 (27.58 ± 9.19 kcal/kg/day) compared to Group 2 (31.12 ± 8.27 kcal/kg/day; p = .02). The proportion of energy derived from carbohydrates was also significantly lower in Group 1 (63.18 ± 15.82%) than in Group 2 (76.41 ± 13.43%; p<.001). Daily protein intake did not differ significantly between groups (p =.16); however, the proportion of protein derived from plant-based sources was significantly higher in Group 1 (72.35%) compared to Group 2 (31.75%) (p<.001).

Mean daily fiber intake was significantly greater in Group 1 (22.92 ± 5.53 g/day) than in Group 2 (17.93 ± 4.84 g/day; p<.001). Regarding daily food consumption frequencies, Group 1 consumed significantly more vegetables [5 (3–7) vs. 3 (2–6) portions/day], fruits [3 (1–5) vs. 2 (1–3) portions/day], and cereals [7 (3–9) vs. 3 (1–4) portions/day] than Group 2 (all p<.001).

Following treatment, treatment-resistant vaginitis persisted in 2 patients (3.1%) in Group 1 and in 9 patients (14.1%) in Group 2, indicating a significantly higher rate of resistance in the control group (p<.05).

Table 1. *Anthropometric measurements and food consumption distribution of patients*

	All patient (n=128)	Group 1 (n=64)	Group 2 (n=64)	p value	test value	Cohen's d	Average Difference	95% Confidence Interval
	X±SD	X±SD	X±SD					
Age(year)	49.32±10.53	48.11±9.97	50.53±11.02	.19*	-1.303	0.23	2.42	-1.22 to 6.06
BMI (kg/m^2)	27.95±6.72	27.81±5.81	28.09±6.23	.79*	-0.263	0.05	0.28	-1.81 to 2.37
Total body fat (%)	34.87±8.76	33.79±8.33	35.94±7.27	.12*	-1.556	0.28	2.15	-0.56 to 4.86
Abdominal region fat (%)	36.29±10.52	35.57±9.11	37.12±10.05	.36*	-0.914	0.16	1.55	-1.77 to 4.87
Energy (kcal/kg/day)	29.35±9.47	27.58±9.19	31.12±8.27	**.02***	-2.291	0.4	3.54	0.51 to 6.57
Carbohydrate consumption (%)	69.78±14.39	63.18±15.82	76.41±13.43	**<.001***	-5.10	0.9	13.23	8.15 to 18.31
Protein (g/day)	0.88±0.31	0.84±0.29	0.91±0.27	.16*	-1.413	0.25	0.07	-0.03 to 0.17
Vegetable protein (%)	52.05±10.37	72.35±10.07	31.75±9.87	**< .001***	23.035	-4.07	-40.6	-44.05 to – 37.15
Animal protein (%)	47.95±10.37	27.65±10.07	68.25±9.87	**< .001***	-23.035	4.07	40.6	37.15 to 44.05
Fiber (g)	20.43±5.83	22.92±5.53	17.93±4.84	**< .001***	5.432	-0.96	-4.99	-6.79 to – 3.19

*Group 1: Mediterranean Diet, Group 2: Control, * Independent t test.*

Table 2. *Demographic data and food consumption distribution of patients*

	All patient (n=128)	Group 1 (n=64)	Group 2 (n=64)	p value	test value	Dependency Coefficient (Cohen's ω)
	Median (min-max)	Median (min-max)	Median (min-max)			
Vegetable consumption (portion/day)	4 (2-7)	5 (3-7)	3 (2-6)	**< .001***	6.461	-
Fruit consumption (portion/day)	2 (1-5)	3 (1-5)	2 (1-3)	**< .001***	3.228	-
Grain consumption (portion/day)	4 (1-9)	7 (3-9)	3 (1-4)	**< .001***	7.455	-
	n (%)	**n (%)**	**n (%)**			
Marital status						
Single	39 (30.5)	21 (32.8)	18 (28.1)	.57**	0.332	5.1
Married	89 (69.5)	43 (67.2)	46 (71.9)			
Education status						
≤12	76 (59.4)	35 (54.7)	41 (64.1)	.28**	1.166	9.5
12	52 (40.6)	29 (45.3)	23 (35.9)			
Working status						
Yes	67 (52.3)	37 (57.8)	30 (46.9)	.22**	1.535	10.9
No	61 (47.7)	27 (42.2)	34 (53.1)			
Menopausal period						
premenopause	45 (35.2)	24 (37.5)	21 (32.8)	.58**	0.308	4.9
postmenopause	83 (64.8)	40 (62.5)	43 (67.2)			
BMI						
<30	93 (72.7)	43 (67.2)	50 (78.1)	.17**	1.927	12.3
≥30	35 (27.3)	21 (32.8)	14 (21.9)			
Diabetes Mellitus	54 (42.2)	29 (45.3)	25 (39.1)	.47**	0.513	6.3
Vaginal operation history	9 (7.1)	5 (7.8)	4 (6.2)	.73**	0.120	3.1
Birth history	114 (89.1)	59 (92.2)	55 (85.9)	.26**	1.283	10.0
Birth method						
Vaginal	92 (71.9)	44 (68.8)	48 (75)	.43**	0.618	7.0
C/S	36 (28.1)	20 (31.2)	16 (25)			
Vaginitis history	67 (52.3)	31 (48.4)	36 (56.3)	.38**	0.783	7.8
Vaginitis clinic continuing after treatment	11 (8.6)	2 (3.1)	9 (14.1)	**.03****	4.203	17.7

Group 1: Mediterranean Diet, Group 2: Control, * Mann Whitney-U testi, ** Chi square test.

Table 3. *Clinical data of treatment-resistant and susceptible patients after bacterial vaginitis treatment*

	All patient (n=128)	Successful Group (n=117)	Failed Group (n=11)	p value	test value	Dependency Coefficient (Cohen's ω)
	n (%)	n (%)	n (%)			
Menopausal period						
premenopause	45 (35.2)	42 (35.9)	3 (27.3)	.57*	0.328	5.1
postmenopause	83 (64.8)	75 (64.1)	8 (72.7)			
BMI						
<30	93 (72.7)	89 (76.1)	4 (36.4)	**.005***	7.977	25.0
≥30	35 (27.3)	28 (23.9)	7 (63.6)			
Diabetes Mellitus	54 (42.2)	45 (38.5)	9 (81.8)	**.005***	7.748	24.6
Vaginal operation history	9 (7.1)	7 (5.9)	2 (18.2)	**.006***	2.292	13.4
Vaginitis history	67 (52.3)	57 (48.7)	10 (90.9)	**.04***	7.174	23.7
Birth history	114 (89.1)	105 (89.7)	9 (81.8)	.42*	0.649	7.1
Birth method						
Vaginal	92 (71.9)	85 (72.6)	7 (63.6)	.53*	0.404	5.6
C/S	36 (28.1)	32 (27.4)	4 (36.4)			
Diet						
Normal diet	64 (50)	55 (47.1)	9 (81.8)	**.03***	4.873	19.5
Mediterrenian	64 (50)	62 (52.9)	2 (18.2)			

Group 1: Mediterranean Diet, Group 2: Control, * Chi square test.

Participants were further categorized into two outcome groups: successful (n = 117; 91.4%) and unsuccessful (n = 11; 8.6%) based on treatment response. No significant differences were observed between these groups in terms of menopausal status, birth history, or delivery method (p>.05). However, the unsuccessful treatment group had significantly higher rates of obesity (BMI >30 kg/m²), presence of DM, prior vaginal surgery, a history of vaginosis, and non-adherence to the Mediterranean diet (p<.05; Table 3).

Multivariate logistic regression analysis revealed that high BMI (≥30 kg/m²) was significantly associated with treatment resistance (OR = 5.56, 95% CI: 1.52–20.41, p<.05). Similarly, presence of diabetes mellitus (OR = 7.21, 95% CI: 1.49–34.85, p<.05), history of vaginosis (OR = 10.53, 95% CI: 1.31–84.88, p<.05), and non-adherence to the Mediterranean diet (OR = 5.07, 95% CI: 1.05–24.49, p<.05) were found to be independent risk factors for persistent vaginitis. However, a history of vaginal operation was not significantly associated with treatment failure (OR = 3.49, 95% CI: 0.63–12.89, p>.05) (Table 4).

Table 4. *Relationship between treatment-resistant vaginitis and clinical data*

	Odds ratio	%95 confidence interval (Lower – Upper)	p value
Body Mass Index	5.56	1.52 – 20.41	**< .05**
Diabetes Mellitus	7.21	1.49 – 34.85	**< .05**
Vaginal Operation History	3.49	0.63 – 12.89	> .05
Vaginitis History	10.53	1.31 – 84.88	**< .05**
Diet	5.07	1.05 – 24.49	**< .05**

4. DISCUSSION

Women's health constitutes a cornerstone of development and societal progress, particularly in low – and middle-income countries. If left untreated, vaginitis can result in severe complications, including uterine, cervical, and ovarian cancers, infertility, chronic pelvic pain, and ectopic pregnancy [10]. The findings of this study demonstrate that adherence to the Mediterranean diet—characterized by a high intake of vegetables, fruits, nuts, legumes, seafood, and olive oil—significantly enhances the therapeutic response in patients with bacterial vaginosis (BV). As such, the incorporation of nutritional therapy into vaginitis treatment protocols holds considerable promise from a public health perspective.

An inverse correlation was observed between the incidence of vaginitis and adherence to a healthy diet, sufficient physical activity, and psychological well-being. These lifestyle components have been consistently associated with improved vaginal health outcomes [32]. The Mediterranean diet was recognized by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2010 as a model dietary pattern that promotes health and longevity [33]. The improved treatment response observed in the intervention group (Group 1) aligns with the findings of Parsapour et al., who reported that health-promoting lifestyle interventions positively influence women's health [21].

Notably, the Mediterranean diet is distinguished by its high consumption of plant-based foods and limited intake of dairy products [34]. In this study, participants in Group 1 exhibited significantly higher consumption of vegetables, fruits, and protein-rich foods compared to the control group. These dietary components—particularly fresh fruits and vegetables—are rich sources of vitamins and minerals essential for maintaining vaginal health. Nutrients such as phytosterols, vitamins C and E, beta-carotene, and calcium may exert protective effects through antioxidant mechanisms that reduce cellular proliferation [35]. Zodzika et al. demonstrated that vaginal administration of ascorbic acid improved vaginal pH and microflora composition [36]. Furthermore, consistent with the present findings, previous research has shown that reduced sugar and dairy intake, coupled with increased fruit and vegetable consumption, contributes to the effective management of vaginitis [37]. Additionally, trace elements such as iron and zinc have been implicated in modulating immune function, particularly mucosal immunity—a relationship that appears to be mediated by dietary diversity [38]. Therefore, the Mediterranean diet, due to its nutritional richness and variety, may serve as an effective dietary strategy for managing vaginitis.

Weight management, maintenance of an optimal body mass index (BMI), and stress regulation are also critical factors in the effective management of vaginitis. Nyirjesy et al. reported a higher prevalence of BV symptoms—such as irritation, itching, and abnormal vaginal discharge—among obese individuals compared to those with normal BMI values [39]. The Mediterranean diet, which provides a minimum of 14 grams of dietary fiber per 1000 kilocalories—approximately twice the fiber content of a typical Western diet—contributes to weight control, improved gut microbiota, and reduced serum cholesterol and insulin levels [40]. In alignment with these findings, the current study identified elevated BMI as a risk factor for vaginitis.

Additionally, the presence of diabetes mellitus (DM) was identified as another risk factor. While some studies have found no direct association between elevated HbA1c levels and BV, borderline HbA1c values have been significantly associated with BV [41]. It is worth noting that in both the current and referenced studies, the impact of antihyperglycemic medications on vaginal microbiota was not examined. Given the potential modulatory effects of these drugs, future research should aim to isolate and assess their specific contributions.

Vaginitis is not confined to women of reproductive age but is also prevalent among postmenopausal women. The decline in estrogen levels during menopause reduces glycogen stores in vaginal epithelial cells, leading to diminished lactobacilli populations, which rely on glycogen for sustenance. These hormonal changes are accompanied by an elevated vaginal pH, reduced skin elasticity, and a decrease in vaginal secretions, collectively contributing to increased vulvovaginal discomfort

and a predisposition to infections [39]. Although the altered hormonal milieu in postmenopausal women increases susceptibility to BV, menopausal status does not appear to significantly influence treatment outcomes [42]. Moreover, comparative studies examining treatment responses between premenopausal and postmenopausal women remain scarce. In the present study, no significant difference in treatment efficacy was observed between these two groups.

The Mediterranean diet is rich in mono – and polyunsaturated fatty acids, as well as polyphenols and antioxidants, and has been shown to exert beneficial effects on the composition of the gut microbiota [43]. Fava et al. reported that adherence to the Mediterranean diet increased the abundance of Lactobacillus, Bifidobacterium, and Prevotella species, while reducing Clostridium populations [44]. It is hypothesized that the favorable response to treatment observed in Group 1 may be attributable, in part, to the prebiotic properties of dietary fiber, which modulate the vaginal microbiota.

The overarching aim of this study was to enhance women's health and mitigate the adverse effects of vaginitis through dietary intervention. Given the potential to reduce both disease burden and healthcare costs, the implementation of nutritional therapy—specifically, adherence to the Mediterranean diet—may constitute a cost-effective and sustainable approach for the management of BV [45]. However, the present study did not fully account for confounding variables such as psychological stress, physical activity, and comorbid health conditions, which may have influenced the findings. One of the primary strengths of this study lies in the homogeneous distribution of participants in Groups 1 and 2 with respect to anthropometric parameters, including body mass index (BMI), total body fat, and abdominal fat at baseline. Additionally, most previous studies in this field have predominantly focused on women of reproductive age (15–49 years). However, vaginitis is not exclusive to younger women; it is also frequently observed in postmenopausal women. Notably, in the present study, 65% of the participants were postmenopausal, which is a valuable contribution toward broadening clinical awareness and tailoring treatment strategies for this demographic group. Besides, our findings suggest that diet can serve as a complementary approach to conventional medical treatment in the management of BV. Considering the rise in antibiotic resistance, lifestyle-based interventions may offer an effective and sustainable solution to enhance treatment efficacy, particularly in high-risk populations. Importantly, no significant differences were observed between the intervention and control groups in terms of sociodemographic or baseline clinical characteristics, supporting the conclusion that the improved outcomes were primarily attributable to dietary adherence. Accordingly, future longitudinal studies are warranted to validate these results and to assess the long-term feasibility and clinical efficacy of dietary interventions, while systematically controlling for such confounding factors.

One of the primary strengths of this study lies in the homogeneous distribution of participants in Groups 1 and 2 with respect to anthropometric parameters, including body mass index (BMI), total body fat, and abdominal fat at baseline. Additionally, most previous studies in this field have predominantly focused on women of reproductive age (15–49 years). However, vaginitis is not exclusive to younger women; it is also frequently observed in postmenopausal women. Notably, in the present study, 65% of the participants were postmenopausal, which is a valuable contribution toward broadening clinical awareness and tailoring treatment strategies for this demographic group.

Despite contributing to a broader understanding of the association between the Mediterranean diet and vaginitis, the study has several limitations. First, dietary intake was assessed using a three-day food intake diary and a Mediterranean Diet Adherence Scale. Since these instruments are based on self-reported data, the potential for recall bias and reporting inaccuracies must be acknowledged. Since individuals could not be followed up verbatim during the dietary intake questionnaire, we used information provided by individuals in the intake records. Monitoring and recording their intake verbatim would eliminate this limitation. Second, the medication status of patients with diabetes mellitus (DM) was not assessed. This omission represents a limitation, as anti-hyperglycemic medications may affect the composition of the vaginal microbiota. Secondly, the medication status of patients with diabetes mellitus (DM) was not assessed. This omission represents a limitation, as anti-hyperglycemic medications may influence the composition of the vaginal microbiota. Finally, The short follow-up duration did not allow assessment of long-term treatment outcomes.

5. CONCLUSION

This study demonstrates that adherence to the Mediterranean diet may improve treatment success and reduce resistance in bacterial vaginosis. These findings underscore the potential role of dietary interventions as adjunctive therapies in managing BV, especially in patients with obesity, diabetes, or recurrent infections. Future studies with larger sample sizes and randomized controlled designs are needed to confirm these results, explore the long-term effects, and elucidate the underlying biological mechanisms.

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