

# Analysis of Online Diet Recommendations for Vitiligo

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## PRACTICE POINTS

- There are numerous online dietary and supplement recommendations that claim to impact vitiligo but most are not authored by medical professionals or dermatologists.
- Scientific evidence supporting specific dietary and supplement recommendations for vitiligo is limited.
- Current preliminary data support the potential recommendation for dietary supplementation with vitamin D, vitamin B<sub>12</sub>, zinc, and omega-3 fatty acids.

Internet platforms have become a common source of information for individuals with skin diseases such as vitiligo, and the vitiligo community frequently turns to online sources for diet modifications that may be beneficial for their disease. In this study, our objective was to summarize information from the most frequently visited websites providing diet suggestions that reportedly affected vitiligo symptoms. Notable diet categories for food components included vitamins, fruits, omega-3 fatty acids, grains, minerals, vegetables, and nuts. Evidence supporting online dietary recommendations for vitiligo is limited in the published scientific literature. Further controlled clinical trials are warranted to assess the relationship between diet and vitiligo and evaluate the accuracy of online diet recommendations for vitiligo.

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Internet platforms have become a common source of medical information for individuals with a broad range of skin conditions including vitiligo. The prevalence of vitiligo among US adults ranges from 0.76% to 1.11%,

with approximately 40% of adult cases of vitiligo in the United States remaining undiagnosed.<sup>1</sup> The vitiligo community has become more inquisitive of the relationship between diet and vitiligo, turning to online sources for suggestions on diet modifications that may be beneficial for their condition. Although there is an abundance of online information, few diets or foods have been medically recognized to definitively improve or worsen vitiligo symptoms. We reviewed the top online web pages accessible to the public regarding diet suggestions that affect vitiligo symptoms. We then compared these online results to published peer-reviewed scientific literature.

## Methods

Two independent online searches were performed by Researcher 1 (Y.A.) and Researcher 2 (I.M.) using Google Advanced Search. The independent searches were performed by the reviewers in neighboring areas of Chicago, Illinois, using the same Internet browser (Google Chrome). The primary search terms were *diet* and *vitiligo* along with the optional additional terms *dietary supplement(s)*, *food(s)*, *nutrition*, *herb(s)*, or *vitamin(s)*. Our search included any web pages published or updated from January 1, 2010, to December 31, 2021, and originally scribed in the English language. The domains “.com,” “.org,” “.edu,” and “.cc” were included.

From this initial search, Researcher 1 identified 312 web pages and Researcher 2 identified 314 web pages. Each reviewer sorted their respective search results to identify the number of eligible records to be screened. Records were defined as unique web pages that met the search criteria. After removing duplicates, Researcher 1 screened 102 web pages and Researcher 2

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The eTable is available in the Appendix online at [www.mdedge.com/dermatology](http://www.mdedge.com/dermatology).

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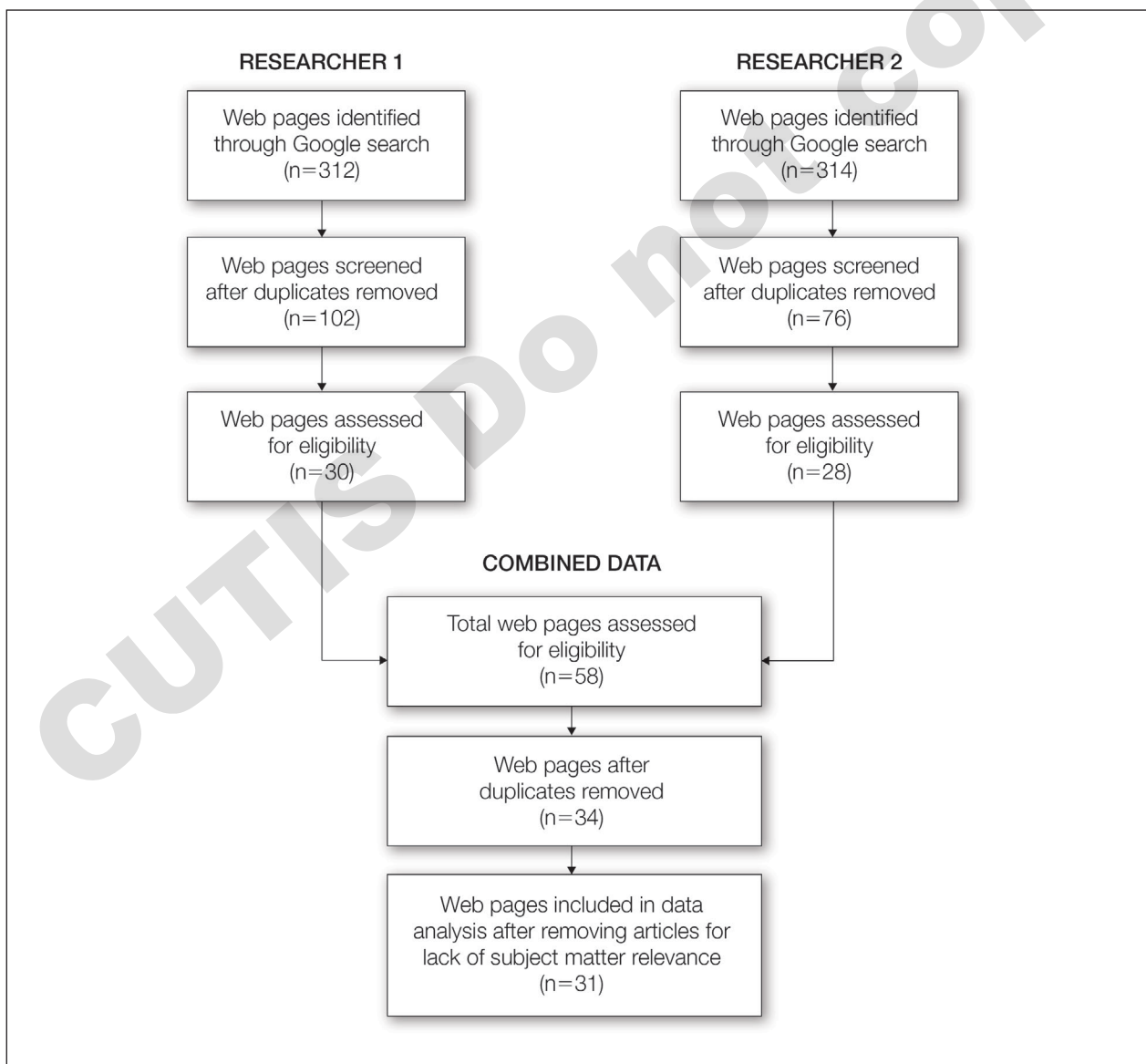
screened 76 web pages. Of these records, web pages were excluded if they did not include any diet recommendations for vitiligo patients. Each reviewer independently created a list of eligible records, and the independent lists were then merged for a total of 58 web pages. Among these 58 web pages, there were 24 duplicate records and 3 records that were deemed ineligible for the study due to lack of subject matter relevance. A final total of 31 web pages were included in the data analysis (Figure). Of the 31 records selected, the reviewers jointly evaluated each web page and recorded the diet components that were recommended for individuals with vitiligo to either include or avoid (eTable).

For comparison and support from published scientific literature, a search of PubMed articles indexed

for MEDLINE was conducted using the terms *diet* and *vitiligo*. Relevant human clinical studies published in the English-language literature were reviewed for content regarding the relationship between diet and vitiligo.

## Results

Our online search revealed an abundance of information regarding various dietary modifications suggested to aid in the management of vitiligo symptoms. Most web pages (27/31 [87%]) were not authored by medical professionals or dermatologists. There were 27 diet components mentioned 8 or more times within the 31 total web pages. These diet components were selected for further review via PubMed. Each item was searched on PubMed using the term "[respective diet component] and vitiligo" among



Methods for online literature review. Two independent researchers (Y.A. and I.M.) performed identical online web searches resulting in a total of 34 unique web pages. Three web pages were excluded from the analysis due to irrelevance for a final total of 31 unique web pages.

all published literature in the English language. Our study focused on summarizing the data on dietary components for which we were able to gather scientific support. These data have been organized into the following categories: vitamins, fruits, omega-3 fatty acids, grains, minerals, vegetables, and nuts.

**Vitamins**—The online literature recommended inclusion of vitamin supplements, in particular vitamins D and B<sub>12</sub>, which aligned with published scientific literature.<sup>2,3</sup> Eleven of 31 (35%) web pages recommended vitamin D in vitiligo. A 2010 study analyzing patients with vitiligo vulgaris (N=45) found that 68.9% of the cohort had insufficient (<30 ng/mL) 25-hydroxyvitamin D levels.<sup>2</sup> A prospective study of 30 individuals found that the use of tacrolimus ointment plus oral vitamin D supplementation was found to be more successful in repigmentation than topical tacrolimus alone.<sup>3</sup> Vitamin D dosage ranged from 1500 IU/d if the patient's serum 25-hydroxyvitamin D levels were less than 20 ng/mL to 3000 IU/d if the serum levels were less than 10 ng/mL for 6 months.

Dairy products are a source of vitamin D.<sup>2,3</sup> Of the web pages that mentioned dairy, a subtle majority (4/7 [57%]) recommended the inclusion of dairy products. Although many web pages did not specify whether oral vitamin D supplementation vs dietary food consumption is preferred, a 2013 controlled study of 16 vitiligo patients who received high doses of vitamin D supplementation with a low-calcium diet found that 4 patients showed 1% to 25% repigmentation, 5 patients showed 26% to 50% repigmentation, and 5 patients showed 51% to 75% repigmentation of the affected areas.<sup>4</sup>

Eleven of 31 (35%) web pages recommended inclusion of vitamin B<sub>12</sub> supplementation in vitiligo. A 2-year study with 100 participants showed that supplementation with folic acid and vitamin B<sub>12</sub> along with sun exposure yielded more effective repigmentation than either vitamins or sun exposure alone.<sup>5</sup> An additional hypothesis suggested vitamin B<sub>12</sub> may aid in repigmentation through its role in the homocysteine pathway. Although the theory is unproven, it is proposed that inhibition of homocysteine via vitamin B<sub>12</sub> or folic acid supplementation may play a role in reducing melanocyte destruction and restoring melanin synthesis.<sup>6</sup>

There were mixed recommendations regarding vitamin C via supplementation and/or eating citrus fruits such as oranges. Although there are limited clinical studies on the use of vitamin C and the treatment of vitiligo, a 6-year prospective study from Madagascar consisting of approximately 300 participants with vitiligo who were treated with a combination of topical corticosteroids, oral vitamin C, and oral vitamin B<sub>12</sub> supplementation showed excellent repigmentation (defined by repigmentation of more than 76% of the originally affected area) in 50 participants.<sup>7</sup>

**Fruits**—Most web pages had mixed recommendations on whether to include or avoid certain fruits. Interestingly, inclusion of mangoes and apricots in the diet were highly

recommended (9/31 [29%] and 8/31 [26%], respectively) while fruits such as oranges, lemons, papayas, and grapes were discouraged (10/31 [32%], 8/31 [26%], 6/31 [19%], and 7/31 [23%], respectively). Although some web pages suggested that vitamin C-rich produce including citrus and berries may help to increase melanin formation, others strongly suggested avoiding these fruits. There is limited information on the effects of citrus on vitiligo, but a 2022 study indicated that 5-demethylnobiletin, a flavonoid found in sweet citrus fruits, may stimulate melanin synthesis, which can possibly be beneficial for vitiligo.<sup>8</sup>

**Omega-3 Fatty Acids**—Seven of 31 (23%) web pages recommended the inclusion of omega-3 fatty acids for their role as antioxidants to improve vitiligo symptoms. Research has indicated a strong association between vitiligo and oxidative stress.<sup>9</sup> A 2007 controlled clinical trial that included 28 vitiligo patients demonstrated that oral antioxidant supplementation in combination with narrowband UVB phototherapy can significantly decrease vitiligo-associated oxidative stress ( $P < .05$ ); 8 of 17 (47%) patients in the treatment group saw greater than 75% repigmentation after antioxidant treatment.<sup>10</sup>

**Grains**—Five of 31 (16%) web pages suggested avoiding gluten—a protein naturally found in some grains including wheat, barley, and rye—to improve vitiligo symptoms. A 2021 review suggested that a gluten-free diet may be effective in managing celiac disease, and it is hypothesized that vitiligo may be managed with similar dietary adjustments.<sup>11</sup> Studies have shown that celiac disease and vitiligo—both autoimmune conditions—involve IL-2, IL-6, IL-7, and IL-21 in their disease pathways.<sup>12,13</sup> Their shared immunogenic mechanism may account for similar management options.

Upon review, 2 case reports were identified that discussed a relationship between a gluten-free diet and vitiligo symptom improvement. In one report, a 9-year-old child diagnosed with both celiac disease and vitiligo saw intense repigmentation of the skin after adhering to a gluten-free diet for 1 year.<sup>14</sup> Another case study reported a 22-year-old woman with vitiligo whose symptoms improved after 1 month of a gluten-free diet following 2 years of failed treatment with a topical steroid and phototherapy.<sup>15</sup>

Seven of 31 (23%) web pages suggested that individuals with vitiligo should include wheat in their diet. There is no published literature discussing the relationship between vitiligo and wheat. Of the 31 web pages reviewed, 10 (32%) suggested including whole grain. There is no relevant scientific evidence or hypotheses describing how whole grains may be beneficial in vitiligo.

**Minerals**—Eight of 31 (26%) web pages suggested including zinc in the diet to improve vitiligo symptoms. A 2020 study evaluated how different serum levels of zinc in vitiligo patients might be affiliated with interleukin activity. Fifty patients diagnosed with active vitiligo were tested for serum levels of zinc, IL-4, IL-6, and IL-17.<sup>16</sup> The results showed that mean serum levels of zinc were lower in vitiligo patients compared with patients without

vitiligo. The study concluded that zinc could possibly be used as a supplement to improve vitiligo, though the dosage needs to be further studied and confirmed.<sup>16</sup>

**Vegetables**—Eleven of 31 (35%) web pages recommended leafy green vegetables and 13 of 31 (42%) recommended spinach for patients with vitiligo. Spinach and other leafy green vegetables are known to be rich in antioxidants, which may have protective effects against reactive oxygen species that are thought to contribute to vitiligo progression.<sup>17,18</sup>

**Nuts**—Walnuts were recommended in 11 of 31 (35%) web pages. Nuts may be beneficial in reducing inflammation and providing protection against oxidative stress.<sup>9</sup> However, there is no specific scientific literature that supports the inclusion of nuts in the diet to manage vitiligo symptoms.

## Comment

With a growing amount of research suggesting that diet modifications may contribute to management of certain skin conditions, vitiligo patients often inquire about foods or supplements that may help improve their condition.<sup>19</sup> Our review highlighted what information was available to the public regarding diet and vitiligo, with preliminary support of the following primary diet components: vitamin D, vitamin B<sub>12</sub>, zinc, and omega-3 fatty acids. Our review showed no support in the literature for the items that were recommended to avoid. It is important to note that 27 of 31 (87%) web pages from our online search were not authored by medical professionals or dermatologists. Additionally, many web pages suggested conflicting information, making it difficult to draw concrete conclusions about what diet modifications will be beneficial to the vitiligo community. Further controlled clinical trials are warranted due to the lack of formal studies that assess the relationship between diet and vitiligo.

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## APPENDIX

## Summary of Diet Recommendations for Vitiligo From Online Web Pages (N=31)

Diet Component	Recommendation	Responses, n		Diet Component	Recommendation	Responses, n	
		Include	Avoid			Include	Avoid
<b>Vitamins</b>				<b>Nuts</b>			
Vitamin B12 <sup>a</sup>	Include	11	0	Almond	Include	7	0
Vitamin D <sup>a</sup>	Include	11	0	Nuts <sup>a</sup>	Include	5	0
Vitamin E	Include	6	0	Walnut	Include	11	0
Beta-carotene	Include	5	0	Pistachio	Include	5	0
Vitamin C <sup>a</sup>	Mixed	7	7	Cashew	Avoid	0	4
<b>Fruits</b>				<b>Dairy</b>			
Mango	Include	9	0	Yogurt	Include	6	0
Apricot	Include	8	0	Ghee	Include	5	0
Date	Include	6	0	Curd	Avoid	2	5
Fig	Include	6	0	Buttermilk	Avoid	0	5
Orange	Avoid	0	10	Milk	Mixed	8	6
Grape	Avoid	2	7	Dairy products <sup>a</sup>	Mixed	4	3
Papaya	Avoid	3	6	Cheese	Mixed	2	2
Lemon	Avoid	0	8	<b>Botanicals and herbs</b>			
Blueberry	Avoid	1	5	Gingko biloba	Include	4	0
Guava	Avoid	0	5	Basil	Include	3	0
Watermelon	Avoid	1	4	<b>Grains</b>			
Pear	Avoid	0	4	Whole grains	Include	10	0
Melon	Avoid	0	4	Wheat	Include	7	1
Prune	Avoid	0	4	Oats	Include	4	0
Gooseberry	Mixed	2	3	Brown rice	Include	3	0
<b>Vegetables</b>				Gluten <sup>a</sup>	Avoid	0	5
Leafy green vegetables <sup>a</sup>	Include	11	0	<b>Beans/legumes</b>			
Vegetables	Include	6	0	French bean	Include	6	0
Beetroot	Include	11	0	Chickpea	Include	6	0
Spinach <sup>a</sup>	Include	13	3	Beans	Include	5	0
Potato	Include	8	2	Soybean	Include	3	0
Cabbage	Include	4	0	<b>Seafood</b>			
Fenugreek	Include	5	0	Salmon	Include	5	2
Red pepper	Include	6	0	Seafood	Avoid	2	5
White eggplant	Avoid	0	6	Fish	Avoid	3	10
Eggplant	Avoid	1	3	<b>Meats</b>			
Pickles	Avoid	0	7	Lean protein	Include	3	0
Raw garlic	Avoid	3	9	Red meat	Avoid	0	12
				Pork	Mixed	2	1
				Beef	Mixed	4	6

CONTINUED ON NEXT PAGE

eTABLE. (continued)

Diet Component	Recommendation	Responses, n	
		Include	Avoid
<b>Beverages</b>			
Water	Include	4	0
Soft drinks	Avoid	0	11
Alcohol	Avoid	0	7
Beverages in copper glasses	Include	4	0
Coffee	Avoid	0	5
<b>Types of food</b>			
Citrus foods	Avoid	1	5
Junk foods	Avoid	0	9
Spicy foods	Avoid	0	9
Oily foods	Avoid	0	5
Fast food	Avoid	0	3
Sour foods	Avoid	0	4
Foods with preservatives	Avoid	0	6
Food with artificial color	Avoid	0	3
Antioxidant-rich foods <sup>a</sup>	Include	6	0
<b>Miscellaneous</b>			
Soda bicarbonate	Avoid	0	4
Caffeine	Avoid	0	3
Chocolate	Avoid	0	8
Turmeric	Mixed	1	2
Eggs	Include	5	1
Flax seeds	Include	3	0
<b>Minerals</b>			
Zinc <sup>a</sup>	Include	8	0
Iron	Include	4	0
Selenium	Include	3	0
Copper	Include	5	0
<b>Omega-3 fatty acids</b>			
Omega-3 fatty acids <sup>a</sup>	Include	7	1

<sup>a</sup>A PubMed search of articles indexed for MEDLINE supports this recommendation.