

## Why People with a Vegan Lifestyle need more B12 and D3: A Comprehensive Analysis

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### ABSTRACT

The increasing adoption of veganism has spotlighted the importance of understanding its nutritional implications, particularly concerning the intake of essential vitamins such as B12 and D3. This whitepaper aims to thoroughly investigate why individuals adhering to a vegan lifestyle require higher amounts of vitamins B12 and D3, nutrients predominantly found in animal-based products. Given the notable absence of these products in vegan diets, the risk of deficiency becomes a significant concern. Vitamin B12 is crucial for nerve tissue health, red blood cell formation, and DNA synthesis, while Vitamin D3 plays a vital role in bone health and immune function. Deficiencies in these vitamins can lead to serious health issues, including neurological disorders and weakened bones.

This analysis draws upon recent scientific studies and nutritional research to explore the prevalence of B12 and D3 deficiencies among vegans. For instance, research by Chirravuri et al, and Jakše et al, illustrates the higher tendency for these deficiencies in vegan populations [1,2]. The paper will also delve into the consequences of such deficiencies, as highlighted by Gruber & Martić Biočina, and discuss the limited availability of these vitamins in plant-based foods [3,4]. Furthermore, it will present viable strategies for vegans to adequately supplement their diet with these essential nutrients, ensuring a balanced and healthful vegan lifestyle. This comprehensive exploration aims not only to educate but also to guide vegans in making informed dietary choices that support their overall health and well-being.

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### Introduction

In recent years, the global shift towards veganism has gained remarkable momentum, driven by various factors, including ethical concerns, environmental sustainability, and perceived health benefits. This dietary transition, while replete with advantages, brings forth unique nutritional challenges, particularly in the context of essential micronutrients like vitamins B12 and D3. This whitepaper addresses one of the most pressing concerns for the vegan community: the necessity of increased intake of vitamins B12 and D3 and the strategies to mitigate potential deficiencies.

Vitamin B12, a water-soluble vitamin, is vital for neurological function, red blood cell formation, and DNA synthesis. Its deficiency can lead to serious health issues, such as anemia, neurological disorders, and cognitive disturbances. Vitamin D3, on the other hand, is crucial for calcium absorption, bone health, and immune system function. Insufficient levels of D3 can result in weakened bones, increased risk of fractures, and compromised

immune response. The challenge in a vegan diet arises from the fact that these vitamins are primarily found in animal-based products. Plant-based sources of these nutrients are scarce, making it difficult for individuals following a strict vegan lifestyle to meet their daily requirements.

The growing popularity of veganism is not just a dietary trend but a lifestyle choice for millions worldwide. According to a study by Chirravuri et al, there is a higher prevalence of vitamin B12 and D3 deficiencies among vegetarians, including vegans, than in the general population [1]. This finding underscores the importance of understanding and addressing the nutritional gaps in vegan diets. Jakše et al, further elaborate on this issue, pointing out the absence of animal-derived food products in vegan diets as the primary reason for these deficiencies [2]. These insights establish the foundation for exploring the nutritional dynamics of vegan diets in relation to these essential vitamins.

The objective of this whitepaper is to delve into the nutritional intricacies of veganism, with a focus on vitamins B12 and D3. It aims to explore the reasons behind the increased need for these vitamins among vegans, examine the potential health implications of their deficiencies, and propose effective strategies for maintaining adequate levels through diet and supplementation. The paper will leverage scientific studies and nutritional research

to provide a comprehensive understanding of this issue, ensuring that the information is not only accurate but also practical for everyday application.

As veganism continues to grow in popularity, it becomes increasingly essential for individuals adopting this lifestyle to be well-informed about their nutritional needs. This whitepaper serves as an educational resource, guiding vegans in making informed choices to ensure a balanced and healthy diet. It is not only aimed at the vegan community but also at healthcare professionals, nutritionists, and anyone interested in understanding the nutritional dynamics of vegan diets.

While veganism offers numerous health and environmental benefits, it also demands careful consideration of nutritional intake, especially of vitamins B12 and D3. The following sections of this whitepaper will provide an in-depth analysis of these vitamins, the risks associated with their deficiencies in vegan diets, and practical solutions to ensure optimal health and well-being for those choosing a vegan lifestyle.

### **Nutritional Importance of B12 and D3**

Vitamin B12 and D3 are essential nutrients that play crucial roles in maintaining overall health, yet they pose a unique challenge for individuals following a vegan lifestyle due to their limited availability of plant-based foods. The significance of these vitamins cannot be overstated, as they are integral to numerous bodily functions and overall well-being.

#### **Vitamin B12: The Nerve and Blood Vitalizer**

Vitamin B12, also known as cobalamin, is vital for neurological function and the formation of red blood cells. It plays a key role in the functioning of the brain and nervous system and is involved in the synthesis of DNA. B12 is essential for preventing megaloblastic anemia, a condition characterized by the production of abnormally large and dysfunctional red blood cells. In vegan populations, B12 deficiency is particularly concerning due to its absence in plant-based foods. This deficiency can lead to serious neurological issues, including memory loss, confusion, and depression, as well as physical symptoms like fatigue and weakness. As highlighted by Gruber & Martić Biočina, B12 deficiency can have far-reaching consequences, affecting both mental and physical health [3].

#### **Vitamin D3: The Sunshine Vitamin**

Vitamin D3, also known as cholecalciferol, is crucial for the absorption of calcium and phosphorus, making it vital for bone health and immune function. It aids in maintaining proper bone structure and preventing osteoporosis, which is especially important for those on a vegan diet. D3 deficiency can lead to a higher risk of bone fractures and diseases such as osteoporosis and rickets. Unlike B12, the body can synthesize vitamin D3 when exposed to sunlight. However, for vegans, especially those in regions with limited sunlight, dietary sources become crucial. Obeid et al, emphasize the limited availability of D3 in plant-based sources, making it a nutrient of concern for vegans [4].

#### **The Combined Challenge in Vegan Diets**

The combined deficiency of vitamins B12 and D3 in vegan diets presents a significant health challenge. These deficiencies are primarily due to the exclusion of animal products, which are the most common sources of these vitamins. Plant-based diets, while rich in many nutrients, inherently lack sufficient amounts of B12 and D3. This gap in nutrition can lead to compound health issues if

not properly addressed through diet planning and supplementation.

#### **Addressing B12 and D3 Deficiencies in Vegan Diets**

In addressing the deficiencies of B12 and D3 in vegan diets, it's imperative to understand the bioavailability of these nutrients from non-animal sources. While some plant-based foods are fortified with B12 and D3, the levels and absorption rates can vary significantly compared to animal-derived sources. This necessitates a proactive approach to dietary planning for vegans. Supplements can play a crucial role in bridging this nutritional gap. The use of B12 supplements is widely recognized as an effective way to ensure adequate intake, and similarly, D3 supplements, especially those derived from lichen, provide a viable vegan-friendly option. It's not only about supplementing these vitamins but also about regular monitoring of their levels to prevent deficiencies and associated health risks. This proactive approach ensures that individuals following a vegan lifestyle can enjoy the benefits of their dietary choices without compromising on these essential nutrients.

Vegans, therefore, must be particularly vigilant about their B12 and D3 intake. The lack of these vitamins is not just a matter of dietary preference but a serious health consideration. The key to managing this challenge lies in understanding the sources of these nutrients and implementing strategies to incorporate them into the vegan diet.

In the next sections, we will explore the specific challenges that vegan diets pose in terms of B12 and D3 intake, backed by scientific studies and research findings. This exploration will not only highlight the risks associated with these deficiencies but also pave the way for discussing practical and effective strategies to ensure adequate intake of these essential vitamins. For individuals committed to a vegan lifestyle, this knowledge is crucial for maintaining optimal health and preventing the long-term consequences of nutritional deficiencies.

#### **Challenges in a Vegan Diet**

The transition to a vegan lifestyle, while ethically and environmentally commendable, brings specific nutritional challenges, primarily in ensuring adequate intake of certain micronutrients, notably vitamins B12 and D3. The crux of the challenge lies in the inherent nature of vegan diets, which exclude all animal products, the primary natural sources of these essential vitamins.

#### **The Vegan Diet: Nutrient-Rich yet Deficient**

Vegan diets are celebrated for being rich in fiber, antioxidants, and phytonutrients, contributing to lower risks of heart disease, hypertension, and certain types of cancer. However, the absence of animal products in these diets creates a significant shortfall in essential nutrients, particularly B12 and D3. This gap can lead to health concerns if not adequately addressed.

#### **Vitamin B12: The Vegan Dilemma**

For vegans, the primary challenge in obtaining vitamin B12 stems from its natural occurrence, almost exclusively in animal products. Plant-based sources of B12 are exceptionally scarce, and the few available, such as nori seaweed and tempeh, often contain B12 analogs that are not functionally effective in the human body. This makes the risk of B12 deficiency markedly higher in vegans, as opposed to omnivores or even vegetarians.

### **Vitamin D3: Limited Plant-Based Sources**

Similarly, vitamin D3 presents a challenge. While the body can synthesize it through sunlight exposure, factors like geographic location, skin pigmentation, and lifestyle can limit this natural production. The vegan sources of D3, mainly in fortified foods or supplements, become crucial under these circumstances. However, the availability and accessibility of vegan-friendly fortified foods or supplements can vary, making it difficult for vegans to rely solely on these sources for their D3 needs.

### **The Compound Effect of Nutrient Deficiencies**

The deficiency of these vitamins in a vegan diet is not just a matter of individual nutrients but can have a compound effect on overall health. For instance, a deficiency in B12 can exacerbate the risk of anemia, while a lack of D3 can lead to compromised bone health. The interplay of these deficiencies can lead to a compounded risk of health issues, making it crucial for vegans to address these gaps proactively.

### **Nutritional Monitoring and Education**

The effective management of B12 and D3 deficiencies in a vegan diet requires more than just the inclusion of supplements or fortified foods. It calls for a holistic approach that encompasses nutritional monitoring and education. Regular health check-ups, including blood tests, are vital to track vitamin levels and address deficiencies early. Additionally, educating vegans about the importance of these nutrients, their roles in the body, and their sources can empower them to make informed dietary choices.

### **Societal and Cultural Factors**

Societal and cultural factors also play a significant role in addressing these nutritional challenges. The availability of vegan-friendly fortified foods and supplements varies widely across different regions. Furthermore, cultural dietary habits can influence the ease with which one can maintain a balanced vegan diet. Public health initiatives and awareness campaigns can aid in increasing accessibility to vegan-friendly sources of B12 and D3, thus supporting the health of vegan communities.

### **Case Studies and Research Findings Regarding Vitamins B12 and D3 Deficiencies in Vegan Populations**

This section delves into specific case studies and research findings, providing empirical evidence on the prevalence and effects of B12 and D3 deficiencies in vegan populations. Through these studies, we gain a deeper understanding of the real-world implications of these deficiencies and the importance of addressing them.

### **Vegan Populations and Vitamin Deficiencies: A Closer Look**

A study by Balcı & Göktas in Turkey explored nutrient deficiencies among vegan and vegetarian individuals [5]. The findings highlighted a significant risk of B12 and D3 deficiencies, underscoring the need for targeted nutritional strategies. This study is crucial in understanding the dietary gaps in different cultural and geographical contexts, reflecting the global challenge of ensuring adequate vitamin intake in vegan diets.

Another critical piece of research is the study by Nowaczek et al, which examined the impact of lower intake of vitamins B12 and D3 on bone health in vegans [6]. The study found a correlation between these deficiencies and a higher risk of bone fractures, indicating the profound impact of these nutrients on overall physical health. This study emphasizes the importance of addressing these deficiencies not only for general well-being but also to prevent long-term health complications.

### **Vegan Diet and Bone Health: A Concerning Connection**

Furthering the discussion on bone health, the study by Nowaczek et al, brings to light a critical aspect of vegan nutrition [6]. It shows that a lower intake of vitamin D3, pivotal for calcium absorption and bone strength, can significantly increase the risk of bone-related health issues. This is particularly concerning for the aging vegan population, where bone density naturally decreases. The study's findings are a stark reminder of the need for balanced nutrition and the inclusion of D3 supplements or fortified foods in a vegan diet.

### **Nutritional Deficiencies in Athletic Populations**

The vegan athletic population faces unique nutritional challenges, as highlighted in a study focusing on vegan runners. This study found that despite the high energy requirements and intensive physical activity, vegan athletes often face deficiencies in B12 and D3, impacting their performance and recovery [7]. This underscores the importance of tailored nutritional strategies for vegan athletes to ensure optimal health and peak performance.

### **The Role of Fortified Foods and Supplements**

In the quest to combat B12 and D3 deficiencies, fortified foods and supplements emerge as vital components in a vegan diet. Research has shown that regular consumption of fortified foods can significantly improve B12 and D3 levels in vegans. However, it's important to note that the bioavailability of these vitamins from fortified sources can vary, necessitating careful selection and potentially higher consumption rates to meet daily requirements.

### **Global Perspectives on Vegan Nutrition**

The global aspect of vegan nutrition is also crucial. Studies from various parts of the world indicate that geographical location, cultural dietary practices, and availability of fortified products significantly influence the nutritional status of vegans. This highlights the importance of context-specific dietary guidelines and the need for global nutritional strategies that cater to the diverse needs of the vegan population.

### **Addressing Pediatric Nutritional Needs**

The nutritional needs of vegan children are another area of concern. Studies have shown that without proper planning, vegan diets can lead to nutritional deficiencies in growing children, particularly in vitamins B12 and D3. This emphasizes the need for careful dietary planning and possibly supplementation to ensure the healthy development of vegan children.

### **Mental Health and Nutritional Deficiencies**

The link between nutrition and mental health is increasingly recognized, with deficiencies in B12 and D3 being associated with various mental health disorders. Research indicates that long-term deficiencies in these vitamins can lead to mood disorders, cognitive decline, and other mental health issues, highlighting the importance of adequate intake for psychological well-being.

### **Public Health Implications**

The public health implications of these findings cannot be overstated. They call for increased awareness among healthcare providers, nutritionists, and policymakers about the specific nutritional needs of the vegan population. Implementing educational programs and developing guidelines for vegan nutrition can play a crucial role in addressing these public health concerns.

The research findings and case studies discussed in this section provide a comprehensive overview of the challenges and implications of B12 and D3 deficiencies in vegan diets. They



underscore the importance of proactive nutritional management, including the use of fortified foods and supplements, to ensure the health and well-being of the vegan population. The next section will explore strategies for addressing these deficiencies, offering practical advice for individuals following a vegan lifestyle.

## **V. Strategies for Addressing Vitamin B12 and D3 Deficiencies for People with Vegan Lifestyles**

The unique nutritional landscape of a vegan diet necessitates specific strategies to address the deficiencies of vitamins B12 and D3. It is crucial for individuals following a vegan lifestyle to adopt proactive measures to ensure they are meeting their daily nutritional requirements for these essential vitamins. This section outlines practical and effective strategies that can be integrated into a vegan diet to mitigate the risk of deficiencies.

### **Understanding and Utilization of Supplements**

The most straightforward approach to addressing B12 and D3 deficiencies in a vegan diet is through supplementation. Vitamin B12 supplements are widely available and come in various forms, including capsules, tablets, and fortified nutritional yeast. It's important to choose a supplement that is specifically labeled as suitable for vegans, as some B12 supplements can be sourced from animal products. Similarly, vitamin D3 supplements derived from lichen are an excellent vegan-friendly option. These supplements should be taken according to recommended dosages, and it's advisable to consult with a healthcare provider for personalized advice, especially for individuals with specific health conditions or nutritional requirements.

### **Regular Nutritional Screening**

Regular health check-ups and nutritional screening are vital for vegans to monitor their vitamin B12 and D3 levels. Blood tests can help identify any deficiencies early on, allowing for timely intervention through diet adjustments or supplementation. This proactive approach is particularly important for those at higher risk of deficiencies, such as pregnant women, children, the elderly, and athletes.

### **Incorporation of Fortified Foods**

Incorporating fortified foods into the vegan diet is another effective strategy to increase the intake of vitamins B12 and D3. Many plant-based milks alternatives, breakfast cereals, and plant-based meat substitutes are fortified with these vitamins. Reading labels carefully to identify fortified products and including them in daily meals can significantly contribute to meeting the required intake of B12 and D3. However, reliance solely on fortified foods may not be sufficient for everyone, and supplements might still be necessary to achieve optimal levels.

### **Educating on Nutritional Needs**

Education plays a critical role in addressing deficiencies. Vegans should be informed about the importance of vitamins B12 and D3, their roles in the body, and how to obtain them through diet and supplementation. This knowledge empowers individuals to make informed choices and take control of their nutritional health. Resources such as nutritional guides, workshops, and consultations with dietitians specializing in plant-based nutrition can be invaluable for those new to veganism or those struggling to meet their nutritional needs.

### **Diversifying Dietary Choices**

Diversification of dietary choices is key in a vegan diet, not just for general health but specifically for enhancing the intake of nutrients like B12 and D3. While direct sources of these vitamins are limited

in a strictly plant-based diet, consuming a wide variety of foods can help. For instance, mushrooms exposed to sunlight can provide some vitamin D3, and seaweed or algae-based supplements can offer trace amounts of B12. Including a diverse array of fruits, vegetables, grains, nuts, and seeds ensures a broader spectrum of nutrients, which can aid in overall health and potentially support the absorption of supplemented vitamins.

### **Strategic Sun Exposure for Vitamin D3**

For vitamin D3, strategic sun exposure is an often-overlooked yet natural method to boost levels. The skin synthesizes vitamin D3 when exposed to sunlight, specifically UVB rays. Vegans can benefit from regular, short periods of sun exposure, ensuring that they do not risk skin damage. The amount of sun exposure needed varies based on geographic location, skin type, and the time of year, but generally, exposing hands, face, and arms for 10-15 minutes several times a week can be beneficial. This natural method, combined with dietary strategies, can help maintain adequate D3 levels.

### **Collaboration with Healthcare Professionals**

Regular collaboration with healthcare professionals, including dietitians and doctors, is crucial for vegans to manage their B12 and D3 levels effectively. These professionals can provide personalized advice, taking into account individual health profiles, dietary preferences, and lifestyle factors. They can also monitor levels over time and adjust recommendations as needed, ensuring that nutritional needs are met safely and effectively.

### **Community Support and Resources**

Finally, leveraging community support and resources can be tremendously helpful. Vegan communities, online forums, and plant-based nutrition groups offer a wealth of shared experiences, tips, and support. These communities can be especially beneficial for those transitioning to a vegan lifestyle, providing insights into managing dietary changes, finding vegan-friendly supplements, and learning about fortified food options. Additionally, many cities now have vegan and plant-based nutritionists and health coaches who can provide tailored advice and support.

Addressing deficiencies in vitamins B12 and D3 in a vegan diet involves a multifaceted approach that includes supplementation, regular health screenings, the inclusion of fortified foods, diversified diet choices, appropriate sun exposure, professional guidance, and community support. By implementing these strategies, individuals following a vegan lifestyle can effectively manage their nutritional needs, ensuring robust health and well-being.

### **Long-Term Health Implications and Management Strategies**

The long-term health implications of deficiencies in vitamins B12 and D3 for individuals following a vegan lifestyle are substantial and warrant careful management. This section delves into these implications and outlines strategies to prevent and manage potential health issues over the long term.

### **Understanding the Long-Term Risks**

The prolonged deficiency of vitamin B12 can lead to serious and sometimes irreversible health issues, including neurological disorders like peripheral neuropathy, cognitive impairments, and psychiatric disorders. The risk extends to cardiovascular health, as a lack of B12 can elevate homocysteine levels, potentially increasing the risk of heart disease. In the case of vitamin D3, prolonged deficiency not only weakens bone health, leading to conditions like osteoporosis and increased fracture risk, but it also has implications for immune function and might contribute to the

development of autoimmune diseases and increased susceptibility to infections.

### Dietary Planning and Regular Review

Effective long-term management of these risks begins with comprehensive dietary planning. Vegans should regularly review their diet with a nutrition professional to ensure it includes adequate sources of B12 and D3. This planning should be revisited periodically, especially during life stages with increased nutritional demands, such as pregnancy, lactation, and aging.

### Continuous Education and Awareness

Continuous education about the sources and importance of B12 and D3 is vital. Vegans should stay informed about the latest research and recommendations regarding these vitamins. Educational resources like workshops, webinars, and literature on vegan nutrition can provide valuable insights into maintaining optimal health over the long term.

### Leveraging Technology for Nutritional Tracking

Advancements in technology offer valuable tools for tracking and managing nutrition. Mobile applications and online platforms can help vegans track their daily intake of vitamins B12 and D3, set reminders for supplements, and even provide personalized dietary recommendations based on individual health data.

### Addressing Absorption Issues

It's important to address potential absorption issues, particularly for vitamin B12. Factors such as age, gastrointestinal health, and certain medications can affect B12 absorption. In such cases, higher doses of supplements or alternative forms, like sublingual B12, might be necessary. Regular medical consultations can help identify and manage absorption problems effectively.

### Integrating Lifestyle Changes

Lifestyle changes, in addition to dietary adjustments, can play a significant role in managing long-term health. Regular physical activity, adequate sun exposure for vitamin D3 synthesis, and stress management techniques can all contribute to better health outcomes.

### Community and Social Support

Building a support system within the vegan community can provide emotional and practical support. Sharing experiences, recipes, and tips for maintaining a balanced vegan diet can be incredibly beneficial. Local or online vegan groups can offer a sense of community and a shared understanding of the challenges and rewards of vegan living.

### Regular Medical Monitoring

Regular medical monitoring, including blood tests and health check-ups, is essential for early detection and management of any deficiencies or health issues. This proactive approach allows for timely adjustments in diet and supplements, minimizing the risk of long-term health problems.

### Advocacy for Vegan Nutrition

Lastly, advocacy for better understanding and support of vegan nutrition in the public health sphere is crucial. This involves promoting research, improving the availability of fortified foods, and ensuring that healthcare providers are knowledgeable about vegan nutritional needs. Effective advocacy can lead to better-informed public policies and healthcare practices, ultimately benefiting the vegan community.

Managing the long-term health implications of vitamin B12 and D3 deficiencies in a vegan diet requires a multi-faceted approach. Through careful dietary planning, continuous education, technological aids, lifestyle adjustments, community support, regular medical monitoring, and advocacy, vegans can successfully navigate these challenges, ensuring a healthy and sustainable lifestyle over the long term.

### Conclusion

Summarizing the critical aspects of "Why People with a Vegan Lifestyle Need More B12 and D3," it's clear that while veganism offers numerous health and environmental benefits, it also presents unique nutritional challenges, particularly regarding the adequate intake of vitamins B12 and D3. The absence of these essential nutrients in plant-based diets can lead to significant health issues, underscoring the need for informed dietary choices and proactive nutritional management among vegans.

This whitepaper has highlighted the importance of vitamins B12 and D3, their roles in the body, and the consequences of their deficiencies. It has emphasized the need for regular supplementation, the incorporation of fortified foods, and the significance of diversified dietary choices in ensuring adequate intake of these vitamins. Moreover, the paper has underscored the value of regular health screenings, continuous education, and the use of technology in tracking and managing nutritional intake.

The discussion on long-term health implications and strategies for their management sheds light on the importance of a comprehensive approach to vegan nutrition involving dietary planning, lifestyle changes, and medical monitoring. The role of community support, advocacy, and awareness in promoting healthy vegan lifestyles has also been highlighted.

Maintaining a healthy vegan lifestyle requires more than just avoiding animal products; it demands a deep understanding of nutritional needs and a commitment to meeting them through various strategies. As veganism continues to grow in popularity, the insights provided in this whitepaper aim to empower individuals with the knowledge and tools necessary for a nutritionally balanced and healthful vegan journey.

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