

This podcast can be accessed at www.pedscases.com, Apple Podcasting, Spotify, or your favourite podcasting app.

A Plant-Based Diet for Children and Adolescents

Developed by Muzammil Ahmad, Cass Warbeck, and Dr. Mel Lewis for PedsCases.com.
June 9, 2020

Introduction

Hello everyone, my name is Muzammil Ahmad and I am a second year medical student at University of Alberta. And I am Cass Warbeck, a first year medical student at University of Alberta. Together, we will be going over the guidelines on how to appropriately eat a plant-based diet and the health benefits associated with eating a plant-based diet. Our aim is to promote healthier eating in children and adolescents and provide guidance for parents to help them on their journey. A special thanks to Dr. Melanie Lewis, a professor in the Department of Pediatrics at the University of Alberta, for her support of this podcast.

This is our clinical case

Susie, a 13 year old female, has come into the clinic accompanied by her mother. The patient is generally well and has no medical conditions, but she wants to switch to a vegan diet for ethical reasons. Her mother is concerned that the diet could be unhealthy and worries that her daughter will not get all of her nutritional requirements. The mother also mentions that she has heard vegan diets could lead to eating disorders in the future. How would you counsel this patient and her mother?

This PedsCase episode will discuss the following **learning objectives** and then return to the clinical case. By the end of this podcast, listeners will be able to:

- 1) Differentiate between a vegan diet and a plant-based diet.
- 2) Discuss the benefits associated with a plant-based diet and how these diets are appropriate and health promoting for all stages of life.
- 3) Outline how patients can obtain all the necessary nutrients from a plant-based diet.
- 4) Recognize the warning signs of eating disorders in adolescents.
- 5) Discuss ways that parents can support their children and their dietary choices.

What is the difference between a vegan diet and a plant-based diet?

The terms plant-based diet and vegan diet are often used synonymously. However, they can be two very different things depending on the person's reason behind their dietary choices and the way they are executing their diet. One thing that is common among a plant-based diet and vegan diet is the elimination of animal products.

One can choose to eat this way for multiple reasons. The three most common reasons for cutting out animal products are: for the animals, for the environment, and for your health. One may go vegan to avoid playing a role in animal suffering. Animal products require more resources and have higher impact on the environment,¹ which tends to resonate with many people. And thirdly, people cut out animal products as there is research showing the negative health effects of eating animal products that will be discussed later. The reasons for cutting out animal products often overlap.

If someone is doing it for the animals, they call themselves vegan and eat a vegan diet. A vegan diet is broader than a plant-based diet because a vegan diet has one main rule: no animal products. However, plant-based diet tends to refer to a whole food plant-based diet. This entails eating plant-based whole foods and besides avoiding animal products, one also avoids refined and processed foods. One can be vegan and eat a plant-based diet. This is an important distinction to discuss with the patient and the parent so the patient will be eating a healthy diet and can get all their nutrients and health benefits of eating plant-based regardless of why they decided to cut animal products out of their diet.

Health Benefits of a Plant-Based Diet for all Stages of Life

It is a common myth that completely plant-based diets are nutritionally inadequate and may be unsafe. In fact, the American Dietetic Association and Dietitians of Canada 2003 position paper² states that, "Well-planned vegan and other types of vegetarian diets are appropriate for all stages of the life cycle, including during pregnancy, lactation, infancy, childhood, and adolescence. Vegetarian diets offer a number of nutritional benefits, including lower levels of saturated fat, cholesterol, and animal protein as well as higher levels of carbohydrates, fiber, magnesium, potassium, folate, and antioxidants such as vitamins C and E and phytochemicals." The Canadian Pediatric Society³ also states that "vegetarian diets can provide for the needs of children and adolescents", however supplementation may be required for strict vegans who are not consuming any animal products, something we will discuss later in more detail. Similarly, The Academy of Nutrition and Dietetics⁴ and Alberta Health Services⁵ also endorse vegan and vegetarian diets as suitable for all stages of life.

So, not only can children and adolescents grow and thrive on a plant-based diet, but there are additional health benefits associated with it as well! For starters, plant-based diets may reduce the risk of, and even help control symptoms and treat asthma⁶, which is the most common chronic disease in childhood⁷.

Naturally, plant-based diets exclude dairy which is strongly associated with childhood constipation^{8,9}, as well as acne¹⁰. Contrary to popular belief, studies show

that milk consumption in childhood does *not* improve bone integrity¹¹ or protect against stress fractures in adolescent girls¹². Dietary calcium is still important, but we will discuss where it can be found on a plant-based diet a bit later on.

Additionally, plant-based children and teens are at a lower risk of becoming overweight or obese and they are more likely to maintain a normal BMI into and throughout adulthood. These children also tend to consume more fruits and vegetables, less sweets, and overall less saturated and trans fat - all of which are markers of a healthy diet. In fact, lifelong health promoting habits are often instilled in childhood and the benefits of plant-based diets extend far into adulthood. Plant-based diets are associated with a decreased risk of many health conditions including hypertension, type 2 diabetes, obesity, and certain types of cancer^{4,13}.

And heart disease? A whole food, plant-based diet is the only diet ever shown to reverse established heart disease¹⁴. Considering that by age 10, nearly all children have fatty streaks in their arteries¹⁵, it might not be a bad idea for individuals of all ages to adopt a diet that is low in saturated fat and cholesterol and high in fruits, vegetables, and legumes, to help reduce our risk.

Choose Foods from Five Categories

One of the ways parents can ensure their child or teen is getting appropriate nutrition is by encouraging them to choose a variety of foods from five different categories of whole, plant foods every day. It's like learning a new and improved version of the food groups! These categories are: fruits, vegetables, whole grains, legumes, and nuts and seeds¹⁶. If you're still a little skeptical, remember that the new version of Canada's Food Guide¹⁷ released in 2019 actually removed dairy as an essential food group and lists water as the drink of choice! It also suggests that half your plate be made up of fruits and vegetables and recommends choosing "protein foods that come from plants more often."

It is important to remember that children do not need to achieve perfect nutrition every single day! Many of us don't even attain such high standards. What matters most is a healthy intake over time. Even so, there are a few nutrients of special concern that we will address.

The first is meeting caloric and energy needs. The majority of whole, plant foods are lower in energy density compared to processed foods and animal products. This means that you can eat a large volume of food and actually take in less calories! This can be great for weight loss, but it's important to remember that children and youth are growing and have higher energy needs than adults. Although studies have shown that vegetarian and vegan children have adequate energy intake compared to their omnivore peers³, it is still important to make sure that children are getting healthy, concentrated sources of calories and not following a restrictive eating pattern. Examples of such foods are avocados, nut and seed butters, hummus, fortified soy milk, tofu, whole grains in the form of baked goods and pasta, and shakes and smoothies made with healthful ingredients¹⁶.

Addressing Nutrients of Concern

One of the major concerns people tend to have is, “will eating a plant-based diet provide me with all my nutrient needs?”. “Are you able to get all the nutrients?” And the most common question asked is, “ where will I get protein from?” These concerns are unsubstantiated. As mentioned earlier, The Academy of Nutrition and Dietetics published a paper stating, “appropriately planned vegetarian, including vegan, diets are healthful, nutritionally adequate, and may provide health benefits in the prevention and treatment of certain diseases.” Canadian Dietitians of Canada, AHS and Canadian Pediatric Society have similar views. Five of the common nutrients of concerns people have are protein, calcium, iron, B12 and omega-3.

Plant-based diets typically meet or exceed recommended protein intakes when one consumes enough calories for their body⁴. By consuming a variety of foods through the course of the day, one can get sufficient amounts and a variety of essential amino acids when caloric requirements are met⁴. One can ensure they get enough protein by consuming legumes like beans, lentils, chickpeas, tofu and other soy products in their meals. Other foods high in protein are nuts, seeds, nut butters, quinoa, soymilk, whole grains as well as vegetables when consumed in higher amounts.

A second nutrient of concern is calcium as people typically think of dairy when they think of calcium and on a complete plant-based diet, there is no dairy as it is an animal product. There are many plant-based food options to meet one’s calcium requirements. Vegetables that tend to be low in oxalate like kale, Chinese cabbage, turnip greens, bok choy and more have a higher bioavailability than dairy⁴! However, adolescents may not always eat enough vegetables and trying to determine which vegetables are low in oxalate can be difficult. Just for reference, foods high in oxalate have lower calcium bioavailability⁴. Foods like tofu and fortified plant milks have the same bioavailability as dairy products so are a great option to incorporate into your diet daily⁴! Other examples of food that have good amounts of calcium include fortified cereals, white beans, almonds, tahini, figs and oranges.

Iron is also another nutrient many people have concerns over. It has been shown that people eating a plant-based diet consume as much iron as omnivores⁴. A lot of people worry that non-heme iron found in plant-based foods have lower bioavailability. This is true⁴. However, the difference isn’t as big as people think and has been shown not to be an issue⁴. Furthermore, our body is able to absorb more non-heme iron when iron storage is lower as it is able to regulate its needs⁴. Also, as discussed by Academy of Nutrition and Dietetics in their 2017 paper⁴, “lower serum ferritin levels may be an advantage because elevated serum ferritin levels have independently been associated with the risk of developing metabolic syndrome.” Plant-based foods rich in iron include legumes like lentils, beans and chickpeas, tofu and other soy products, mushrooms, spinach, whole grains, dried apricots, and other leafy vegetables as well as fortified plant milks and fortified cereals.

Another common concern about nutrients tends to be vitamin B-12. It is important to mention vitamin B-12 is not a component of plant foods⁴. However, it is also not made by animals and is only found in animals as obtained through their diet or by supplementation in animal agriculture¹⁸. Vitamin B-12 is produced by certain bacteria

and is naturally found in unwashed plant foods and unsanitized water¹⁸. However due to health reasons, those are not safe to consume. Fermented foods like unfortified nutritional yeast cannot be relied upon for sufficient B-12⁴. It is imperative people eating a plant-based diet regularly consume reliable sources of vitamin B-12 like B-12 fortified foods or by taking a simple B-12 supplement⁴. As B-12 deficiency can have detrimental health effects, it is safer to take a B-12 supplement regularly.

The last nutrient to be discussed is omega-3 fatty acids. People often associate omega-3 fatty acids with fish. Fish is one source of omega-3 fatty acids; however, it is important to note that fish do not make omega-3's, they obtain it from the algae they consume¹⁹. There are many plant-based sources of omega-3. The type of omega-3 found in fish and marine foods (algae and seaweed) are Docosahexaenoic acid (DHA) and Eicosapentaenoic acid (EPA) which are long chain omega-3 fatty acids⁴. The type of omega-3 fatty acids in most plant-based foods are Alpha-linolenic acid (ALA) which needs to be converted in our body to EPA and DHA⁴. Evidence suggests that one can meet their omega-3 requirements through ALA alone as long as they consume enough of it⁴. Besides algae and seaweed, other great omega-3 options are ground flax seeds, chia seeds, hemp heart, and walnuts⁴. One tablespoon of ground flaxseeds or two tablespoons of walnuts provide enough ALA per day. However, if one prefers to supplement omega-3 to be on a safer side, there are algae-based DHA supplements that are appropriate for people eating a plant-based diet⁴.

How can parents support their children and their personal dietary choices?

There are several ways that parents can support their child on their health journey. The first would be for the parent to seek out further nutritional education themselves. We will include a few different resources in the transcript notes for this episode that you might like to recommend. Additionally, it can be helpful for the parent to learn how to prepare a couple of simple plant-based meals. This can be as simple as modifying pre-existing family favourites. For example, spaghetti can be made with lentils or chickpeas, black bean patties can be swapped for beef hamburgers, and eggs can easily be substituted with mashed bananas or flaxseed in many baked goods. Other swaps are quite straightforward such as replacing dairy milk with a fortified plant-based milk such as soy, oat, or almond.

By taking an active, educated role in their child's diet, parents will be more likely to ensure their child has access to nutritious, energy packed foods to fuel their growth and activities. This might include packing them lunches or snacks to supplement what might be offered at school, events or friend's houses (like a hearty bean salad or soup). When dining out, it can be helpful to check restaurant menus ahead of time to make sure their child will be able to order something they enjoy! Most restaurants nowadays have at least a couple plant-based options (or meals that can be easily modified). Parents can also make healthy choices convenient, such as stocking up on frozen bean burgers or having ready-to-grab chopped vegetables in the fridge to be served with hummus or peanut butter. Finally, it is possible for parents to keep an eye on their child's nutrition even as they grow older and strive for independence. One way to do this

would be to make family meals routine at least a few times a week, this way a child's dietary intake can be observed¹⁶.

Screening for Eating Disorders in Adolescents that Choose a Vegan Diet

Eating disorders can be very detrimental to one's health physically and mentally. This is even more crucial for adolescents as they are growing rapidly and need to be eating an appropriate amount of calories and to obtain sufficient nutrients. There is a misconception that adolescents switching to a vegan or vegetarian diet are more prone to an eating disorder. Eating disorders are quite complex and switching to a more plant-based diet does not itself inherently put one at an increased risk for an eating disorder⁴. However, it is possible that one may choose to make dietary choices that help them limit their food intake and hence one may switch to a vegetarian or vegan diet⁴.

When an adolescent comes in wanting to switch to a diet that limits food, it is important to make sure they are doing it for the right reasons and not due to an underlying eating disorder. This is where screening for eating disorders becomes imperative. If one is doing it due to an underlying eating disorder, it is very likely they will not consume enough calories as well as getting sufficient nutrients which may be detrimental to health.

After a patient is screened for eating disorders and there does not seem to be any risk for potential harm, one switching to a plant-based diet can be very healthy for them as discussed earlier. Arranging follow up with patients/families changing to a plant-based diet to ensure a healthy weight is maintained and address any concerns is advisable.

Now back to our case example of Susie and her mother...

You perform a thorough history with Susie, who was comfortable having her mother present in the room for the entire duration. Susie reveals that she made the decision to go plant-based after watching a documentary about animal agriculture. She is an avid animal lover and does not want to support the industry any longer. She feels going completely vegan is best since she feels the dairy and egg industries are also considered cruel to animal welfare. She seems very sure about her decision and her mother confirms that she is quite serious about adopting this lifestyle. She is quite active and plays hockey during the winter and soccer during the summer. There are no reasons to suggest a possible eating disorder. Upon physical exam, you conclude that she is a generally well 13-year-old and is following a normal growth curve. There are no outstanding health conditions or concerns. You first validate the mother's concerns but reassure her that a plant-based diet is considered nutritionally appropriate for all stages of life, including adolescence and a vegan diet is also associated with many health benefits! Susie was quite pleased to hear that her acne might improve since she's no longer consuming dairy. You proceed to educate them both on which food groups to choose foods from each day and which nutrients to pay special attention to. You

reinforce the necessity of supplementing with Vitamin B-12. Since she is active, you suggest a few energy dense foods to incorporate as well. Finally, you provide her mother with several resources so she can further her own education and offer the services of a dietitian if they are struggling in any way. You order several laboratory tests to keep track of blood markers and to make sure things stay the same or improve over time. You book a follow-up appointment 2 months from now so that you can check in on Susie and her new lifestyle choice.

Summary: Let's do a quick review of the key take-away points:

- 1) A whole food, plant-based diet is classified as a vegan diet, but a vegan diet is not necessarily associated with the same health benefits and may be adopted for reasons other than health such as animal rights and environmental sustainability.
- 2) Plant-based diets are associated with many health benefits including a lower risk of obesity, heart disease, hypertension, type 2 diabetes, and certain types of cancer. They are nutritionally appropriate for all stages of life including childhood and adolescence.
- 3) To maximize nutrition, it is recommended that children choose foods from five different categories: fruits, vegetables, whole grains, legumes, and nuts and seeds. There are certain nutrients where care should be taken to obtain optimal amounts including protein, calcium, and iron. Supplements necessary to include when eating a plant-based diet include vitamin B12 and vitamin D and potentially omega 3 fatty acids DHA and EPA if not enough omega-3 ALA is being consumed.
- 4) Although a vegan diet does not increase the risk of developing an eating disorder, care should be taken to identify those children and adolescents who might already be at risk.
- 5) There are several ways parents can support their children and their dietary choices including ensuring that their child has access to nutritious, energy dense foods and reinforcing the importance of consuming regular meals.

Additional Resources

The Plantrician Project. Pediatric Plant-Based Nutrition Quick Start Guide. Available online: <https://plantbasedhealthprofessionals.com/wp-content/uploads/Pediatric-Plantrician-Guide.pdf>

Physicians Committee for Responsible Medicine Nutrition Guide for Clinicians. Available online: <https://nutritionguide.pcrm.org/nutritionguide>

NutritionFacts.org

The Plant Prescription Podcast. To be available on iTunes and Spotify by August 2020.

Developed by Muzammil Ahmad, Cass Warbeck, and Dr. Mel Lewis for PedsCases.com. June 9, 2020.

References

1. Poore, J. & Nemecek, T. Reducing food's environmental impacts through producers and consumers. *Science* 2018; 360(6392):987-92.
2. American Dietetic Association & Dietitians of Canada. Position of the American Dietetic Association and Dietitians of Canada: Vegetarian diets. *J Am Diet Assoc* 2003;103(6):748-65.
3. Amit, M., & Canadian Paediatric Society. Vegetarian diets in children and adolescents. *Paediatr Child Health* 2010;15(5)303-314.
4. Melina, V., Craig, W., & Levin, S. Position of the Academy of Nutrition and Dietetics: Vegetarian diets. *J Acad Nutr Diet* 2016;116(12):1970-1980.
5. Alberta Health Services. Healthy vegetarian eating, February 2013. <https://www.albertahealthservices.ca/assets/info/nutrition/if-nfs-healthy-vegetarian-eating.pdf> (Accessed March 29, 2020).
6. Alwarith, J. Kahleova, H. Crosby, L., Brooks, A., Brandon, L., Levin, SM., & Barnard, ND. The role of nutrition in asthma prevention and treatment. *Nutr Rev* 2020. doi: 10.1093/nutrit/nuaa005.
7. Von Mutius, E. The burden of childhood asthma. *Arch Dis Child* 2000; 82 Suppl 2:112-5
8. Dehghani, SM., Ahmadpour, B., Haghghat, M., Kashef, S., Imanieh, MH., & Soleimani, M. The role of cow's milk allergy in pediatric chronic constipation: a randomized clinical trial. *Iran J Pediatr* 2012;22(4):468-74.
9. Irastorza, I., Ibanez, B., Delgado-Sanzonetti, L., Maruri, N., & Victoria, JC. Cow's-milk-free diet as a therapeutic option in childhood chronic constipation. *J Pediatr Gastroenterol Nutr* 2010;51(2):171-6.
10. Adebamowo, CA., Spiegelman, D., Berkey, CS., Danby, FW., Rockett, HH., Colditz, GA., Willett, WC., & Holmes, MD. Milk consumption and acne in teenaged boys. *J Am Acad Dermatol* 2008;58(5):787-93.
11. Lanou, AJ., Berkow, SE., & Barnard, ND. Calcium, dairy products, and bone health in children and young adults: a reevaluation of the evidence. *Pediatrics* 2005;115(3):736-43.
12. Sonnevile, KR., Gordon, CM., Kocher, MS., Pierce, LM., Ramappa, A., & Field, AE. Vitamin D, calcium, and dairy intakes and stress fractures among female adolescents. *Arch Pediatr Adolesc Med* 2012;166(7):595-600.
13. Tuso, P. Nutritional update for physicians: plant-based diets. *Perm J* 2013;17(2):61-66.
14. Esselstyn, CB., Gendy, G., Doyle, J., Golubic, M., & Roizen, MF. A way to reverse CAD? *J Fam Pract* 2014;63(7):356-364b.
15. Voller, RD. & Strong, WB. Pediatric aspects of atherosclerosis. *Am Heart J* 1981;101(6):815-36.
16. Davis, B. & Melina, V. *Becoming vegan: comprehensive edition*. Canada: Book Publishing Company; 2014.
17. Government of Canada. *Canada's food guide*. January 2020. <https://food-guide.canada.ca/en/> (Accessed online March 29, 2020).

18. LeBlanc, JG., Milani, C., de Giori, GS., Sesma, F., van Sinderen, D., & Ventura, M. Bacteria as vitamin suppliers to their host: a gut microbiota perspective. *Curr Opin Biotech* 2013;24(2):160-168.
19. Falk-Petersen, S., Sargent, JR., Henderson, J., Hegseth, EN., Hop, H., & Okolodkov, YB. Lipids and fatty acids in ice algae and phytoplankton from the Marginal Ice Zone in the Barents Sea. *Polar Biology* 1998;20:41-47.