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What is a Plant Predominant Eating Pattern?

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ABSTRACT

The article outlines various plant-predominant diets that focus on consuming plant-based foods and their impact on health. It categorizes diets into vegan, vegetarian, flexitarian, Mediterranean, low-fat, very low-fat, and raw food diets, each with different levels of animal product inclusion.

The vegan diet excludes all animal products, while the vegetarian diet may include dairy and eggs. The flexitarian diet allows occasional meat consumption, and the Mediterranean diet includes fish, seafood, and moderate dairy and poultry. Low-fat and very low-fat diets prioritize whole, minimally processed foods and exclude unhealthy fats and sugars. The raw food diet focuses on uncooked plant foods.

It is important to note that not all vegan diets are high-quality, as they can include unhealthy processed foods. In contrast, a whole foods plant-based (WFPB) diet is nutrient-rich and associated with reduced chronic disease risks.

Specific diets for medical conditions are DASH diet for blood pressure, the Portfolio diet for cholesterol, the MIND diet for Alzheimer's and cognitive health, and the low-fat plant-based diet for type 2 diabetes management. The Fasting Mimicking Diet (FMD) and the historical Rice diet are also mentioned.

Their maybe concerns about protein intake in plant-based diets, but it is possible to meet protein needs through diverse sources. Vegetarians and vegans might need slightly more protein due to lower digestibility of plant proteins and that older adults could benefit from higher protein intake for muscle and bone health. However, excessive animal protein consumption is linked to health risks and reduced life expectancy.

Keywords: Plant-predominant diets, Vegan diet, Vegetarian diet, Flexitarian diet, Mediterranean diet, Raw food diet, Low-fat diet

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WHAT IS A PLANT PREDOMINANT EATING PATTERN?

Plant-predominant eating patterns are diets that focus on plant-based foods, including fruits, vegetables, whole grains, legumes, nuts, and seeds. It emphasizes the foods with minimal to no processing in its' original whole form called as whole foods plant based diet. These diets can include a spectrum of plant-centric diet patterns such as

1. **Vegan diet:** A vegan diet is a plant-based diet that excludes all animal products, including meat, dairy, and eggs.
2. **Vegetarian diet:** A vegetarian diet is a plant-based diet that excludes meat but may include dairy and eggs.
3. **Flexitarian diet:** A flexitarian diet is a plant-based diet that allows for occasional consumption of meat and animal products.
4. **Mediterranean diet:** A Mediterranean diet is a plant-based diet that emphasises fruits, vegetables, whole grains, legumes, nuts, and seeds. It also includes fish, seafood, and moderate amounts of dairy and poultry.
5. **Low-fat diet:** A plant-based diet that emphasises whole, minimally processed foods such as fruits, vegetables, whole grains, legumes, nuts, and seeds. It excludes added sugars, refined grains, and unhealthy fats. E.g.- TLC, Volumetrics
6. **Very low-fat diet:** A plant-based diet that emphasises whole, minimally processed foods such as fruits, vegetables, whole grains & legumes. It excludes added sugars, refined grains, fats & oil, and avoids nuts & seeds too to keep the total fat low. E.g.- Ornish, Esselstyn, McDougal, Pritikin, PCRM
7. **Raw food diet:** A raw food diet is a plant-based diet that emphasizes raw or minimally cooked fruits, vegetables, nuts, and seeds.

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Is Vegan diet similar to whole food plant-based diet?

The distinction between "vegan" and "whole foods plant-based" is important because a vegan diet isn't necessarily a high-quality diet. Meals which contain refined grains, sugary beverages, added sugars, excessive fats, and hyper processed vegan meat and dairy substitutes can still be vegan but not healthful. A WFPB diet is high in quality.[1] It is designed to optimize health, as it is consistent with an extensive body of research showing that healthful, properly planned plant-based diets are associated with reduced risk of mortality, CVD, type 2 diabetes, certain cancers, hypertension, hypercholesterolemia, and obesity.

Some of the plant-predominant diets specifically designed for various medical conditions included are-

The **DASH (Dietary Approaches to Stop Hypertension)** diet is a dietary pattern that is designed to help lower blood pressure and improve overall health.[2] The diet emphasizes fruits, vegetables, whole grains, lean protein, and low-fat dairy products while limiting the intake of saturated and trans fats, added sugars, and sodium. This diet is rich in nutrients such as potassium, calcium, magnesium and fibre which are known to help lower blood pressure & also reduces the risk of heart disease.

The **Portfolio diet** is a dietary pattern that is designed to help lower cholesterol levels and reduce the risk of heart disease & stroke.[3] The diet emphasizes the consumption of fruits, vegetables, whole grains, legumes, nuts, and soy products. The diet also includes specific cholesterol-lowering foods such as oats, barley, psyllium husk, nuts, and soy protein in whole form. This diet has been shown to be effective in reducing LDL cholesterol levels by up to 30%. The Portfolio diet was compared to a low-saturated fat diet and a statin in a head-to-head trial. The study found that the Portfolio diet was more effective in reducing LDL cholesterol levels than the low-saturated fat diet and was equally effective as first generation statin.[4]

The **MIND (Mediterranean-DASH Intervention for Neurodegenerative Delay)** diet is a dietary pattern that is designed to help reduce the risk of Alzheimer's disease and improve cognitive function & reduced risk of heart disease & stroke.[4] The diet emphasizes the consumption of fruits, vegetables, whole grains, legumes, and nuts, as well as fish and poultry. It also includes specific brain-healthy foods such as berries, leafy greens, and nuts. The MIND diet has been shown to be effective in reducing the risk of Alzheimer's disease by up to 53% in those who adhered to the diet rigorously and by up to 35% in those who followed it moderately.

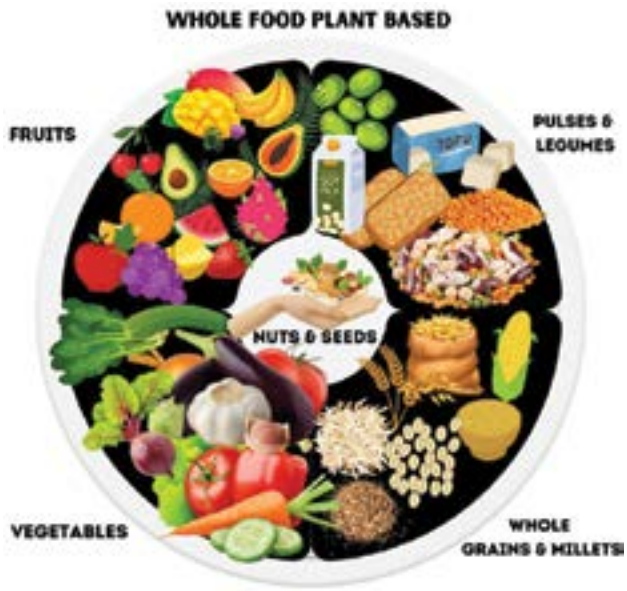

Figure 1. **Whole food plant based plate**

A **low-fat plant-based diet** is a dietary pattern that is rich in whole, minimally processed plant foods such as fruits, vegetables, whole grains, legumes, nuts, and seeds. This diet avoids added sugars, refined grains, and unhealthy fats.[5] Research has shown that a low-fat plant-based diet can be effective in managing type 2 diabetes by improving insulin sensitivity and reducing the risk of heart disease. The diet has also been associated with weight loss and improved glycaemic control. The Physicians Committee for Responsible Medicine recommends a low-fat plant-based diet for the management of type 2 diabetes.

The **Fasting Mimicking Diet (FMD)** is a dietary pattern that is designed to mimic the effects of fasting while still allowing for the consumption of food.[6] The diet involves consuming a low-calorie, low-protein, and high-fat diet for a period of 5 days each month. The diet is designed to promote cellular regeneration and rejuvenation, which can have a range of health benefits.

Interestingly a restrictive plant based diet which was used before insulin & anti-hypertensives were used is the Rice diet.[7] This dietary pattern was developed in the 1930s by Dr. Walter Kempner at Duke University. The diet is based on the consumption of rice, fruit, and sugar, and is low in fat, protein, and salt. The Rice diet was originally designed to treat hypertension and

kidney disease. The diet has been shown to be effective in reducing blood pressure, improving kidney function, and promoting weight loss.

What are the pitfalls & the nutrients of concern in a WFPB Diet?

Although **a WFPB diet is high in quality** certain nutrients are viewed with scepticism traditionally. These nutrients are discussed below-

Protein

A **vegetarian diet** or a vegan diet can easily meet human dietary protein requirements as long as energy needs are met and a variety of foods are eaten.[8] Vegetarians should obtain protein from a variety of plant sources, including legumes, soy products, grains, nuts and seeds. There is no need to consciously combine different plant proteins at each meal as long as a variety of foods are eaten from day to day because the human body maintains a pool of amino acids that can be used to complement dietary protein.[8] Plant proteins may provide a better "protein package" compared with animal proteins.[8] While animal proteins may include high levels of saturated fat, plant proteins contain fibre, heart-healthy fats, vitamins, minerals, and phytochemicals. This may be one reason why vegetarians and vegans experience lower rates of chronic disease.

Vegans may require a slightly higher daily protein intake due to the slight decrease in the digestibility of plant proteins compared with animal proteins.[9] These estimates may vary, but studies show that 1 to 1.1 g/kg of protein may be an appropriate level to compensate for reduced digestibility.[10] Also adults older than 60 may benefit, in terms of optimal muscle and bone mass, from slightly higher intakes of protein than those currently recommended in the DRI, perhaps 1 to 1.3 g/kg/day.[10]

Excessive protein consumption can lead to an increased production of inflammatory metabolites by the intestinal microbiota, and the consumption of saturated fats (found mainly in foods of animal origin) is capable of activating Toll-like receptors in immune system cells.[11,12] This stimulates the production of pro-inflammatory cytokines, and all these factors together can create a cancer-promoting environment. Prioritizing the consumption of proteins from animal sources could have a negative impact on one's life expectancy. The profile of the amino acids found in these foods, with a higher content of methionine and branched-chain amino acids, leads to greater stimulation of IGF-1 and mTOR, in addition to greater cell proliferation. This contributes to the cellular senescence process and, consequently, to ageing.[6,14-16]

Omega 3 fatty acids

There are 3 main omega-3 fatty acids. The short-chain omega-3 fatty acid alpha-linolenic acid (ALA) and the two long-chain omega-3 fatty acids — DHA (docosahexaenoic acid) and EPA (eicosapentaenoic acid). ALA can be found in plants. DHA and EPA in most diet patterns are usually obtained from fish, although fish obtain it from marine algae. The body can convert ALA to DHA/EPA but the rate of conversion varies and may reduce with age and can differ between individuals based on gender, genetic factors and the overall composition of the diet. ALAs are readily available in a wide variety of plant foods. Sources include walnuts, flaxseeds, chia seeds, hemp seeds, edamame, seaweed, canola oil, mustard, soybean & flaxseed oil, algae & some herbs & spices. Other green leafy vegetables and beans also contain small amounts. To meet daily requirements of 2–4 grams of ALA per day a tablespoon of chia seeds or ground flaxseeds (linseeds), two tablespoons of hemp seeds or six walnut halves will be sufficient. There are many vegan DHA supplements made from seaweed, and some include EPA. While the need for vegans to supplement with DHA is debatable, it's more clear that vegans meeting ALA requirements shouldn't need to supplement with EPA.[10,17]

Vegetarians and vegans already have about a one-quarter lower risk of heart disease than regular meat-eaters and on average have lower triglyceride levels; it's not clear that EPA or DHA supplementation will further reduce their risk.[18]

Vitamin B12

Vitamin B12 intake is a significant nutritional concern for vegetarians and vegans, as it's generally found only in animal foods. However, it should be pointed out that vitamin B12 is produced by microorganisms in soil, not by animals. Humans can obtain their recommended dose either by taking a supplement or via foods fortified with B12. Research suggests that vegetarians, and especially vegans, may have inadequate levels of vitamin B12. Vegetarians obtain vitamin B12 from dairy foods and eggs, but vegans don't. Exclusively breastfed infants of vegan mothers with limited Vitamin B12 reserves can have severe neurological damage, failure to thrive, developmental delays, and anaemia as breast milk of vegan mothers have small amounts and only limited amounts of vitamin B12 cross the placenta in these women during fetal development.[19]

In a 2013 review of the literature on vitamin B12 status in vegetarians and vegans, scientists found that vegetarians develop vitamin B12 depletion or deficiency regardless of demographics, place of residency, age, or type of vegetarian diet. Regardless of dietary preference, the NIH recommends that all adults older than 50 must obtain most of their B12 through supplements and fortified foods due to impaired absorption that occurs during ageing. Foods such as nutritional yeast, breakfast cereals, and plant milks can be fortified with vitamin B12, but a regular, consistent supply should be included in the diet. Vitamin B12 and other B vitamins are involved in homocysteine metabolism, and it has been hypothesized that supplementation with these micronutrients can reduce CVD risk by lowering homocysteine levels. However, RCTs have found that vitamin B12 (and folic acid) supplements lower homocysteine levels, but not CVD risk. Also, it has been found that if the folic acid intake is high through fortified foods, it can mask the presence of vitamin B12 deficiency.[20]

Calcium

The RDA for calcium for adults is 1,000 mg per day. It is practically impossible to meet these recommendations without a properly planned vegan diet or without large amounts of dairy, calcium-fortified foods, or supplements Because vegans don't eat dairy products, without fortified foods or supplements their calcium intakes tend to be low (about 400–600 mg per day). Some of the plant-based calcium-rich sources are- red & green Amaranthus, fenugreek leaves, agathi greens, curry, mint, parsley leaves, green & moth beans, ragi & other millets, horse gram, Bengal gram, green gram, rajma, almonds, quinoa, chia seeds, flaxseeds, sesame seeds, poppy seeds, coriander seeds fennel seeds, soybean, tofu, figs. Calcium in bones tends to dissolve into the bloodstream, and then pass through the kidneys into the urine. Sodium (salt) in foods can greatly increase calcium loss through the kidneys. If sodium intake is reduced to 1 to 2 grams per day, calcium retention is better.[21,22]

Vitamin D

Vitamin D is important for bones because it can increase calcium absorption when the body signals that it needs calcium. Without Vitamin D only 10-15% of calcium is absorbed. Increasing vitamin D intake has been shown to reduce fracture risk. In fact, while calcium in dairy products alone may not directly strengthen bones, increasing intake of vitamin D has been shown to reduce fracture risk up to 26%. Cow's milk is not a natural source of vitamin D, as it is added after production, and plant-based milks are fortified with comparable amounts. About 15 minutes of sunlight on the skin each day normally produces all the vitamin D one need's. If there is no sun exposure, one can get vitamin D from a supplement or fortified foods. The recommended dietary allowance is 600 IU (15 micrograms) per day. White button mushrooms when placed in the midday sun for 15–20 minutes, they would form enough vitamin D to provide more than 10µg per 100g of fresh mushroom, which would give the recommended daily dose of vitamin D. There are two forms of supplemental vitamin D: ergocalciferol (D2) and cholecalciferol (D3). Vitamin D2 is always vegan, made from exposing fungi to UV rays. Vitamin D3 normally comes from fish oil or sheep's wool, but there is a vegan version also available.[23]

Iron

The iron in plants (fruits, vegetables, grains, nuts) is less well absorbed than haem iron. Plant based diets only contain non-heme iron, therefore it is important to be aware of foods that are high in iron and techniques that can promote iron absorption. However, surveys of vegans have found that iron deficiency anemia is no more common among vegetarians than among the general population although vegans tend to have lower iron stores. Adding a vitamin C source to a meal increases non-heme iron absorption up to six-fold which makes the absorption of non-heme iron as good or better than that of heme iron. Both calcium and tannins (found in tea and coffee) reduce iron absorption. Tea, coffee, and calcium supplements should be used several hours before a meal that is high in iron.[25,26]

To summarize, plant-predominant diets are which emphasize fruits, vegetables, grains, legumes, nuts, and seeds. These diets range from whole foods plant based, excluding all animal products, to flexitarian, allowing occasional meat. The Mediterranean diet, low-fat, very low-fat, and raw food diets are also included.

A key distinction is made between vegan and whole foods plant-based (WFPB) diets. While both are plant-based, WFPB diets are linked to better health outcomes and lower chronic disease risks due to their high-quality, nutrient-rich food choices.

The article highlights diets designed for specific health conditions:

- **DASH diet:** Targets blood pressure reduction and overall health improvement.
- **Portfolio diet:** Aims to lower cholesterol and heart disease risk.

- **MIND diet:** Seeks to reduce Alzheimer's risk and enhance cognitive function.
- **Low-fat plant-based diet:** Manages type 2 diabetes by improving insulin sensitivity.
- **Fasting Mimicking Diet (FMD):** Simulates fasting benefits with a special diet regimen.
- **Rice diet:** An older diet for hypertension and kidney disease management.

Nutritional concerns, particularly protein intake, are addressed. Plant-based diets can meet protein needs through varied sources. Vegetarians and vegans may need slightly more protein due to plant protein's lower digestibility. Older adults might benefit from higher protein intake for muscle and bone health. However, excessive animal protein consumption is linked to health risks and reduced life expectancy.

In conclusion, there are immense health benefits of diverse plant-centric diets in health & disease states.

END NOTE

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