Is a vegetarian diet healthy for a child?

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Key concepts:

- A well balanced vegetarian diet that includes adequate amounts of essential vitamins and minerals can be a healthy option for a child.
- Vegetarian diets in children are associated with leaner body weight and may be protective against diabetes, heart disease, hypertension and obesity in adulthood.
- The greatest concern with a vegetarian diet is deficiency. If dietary intake of vitamin D, vitamin B12, calcium and iron is inadequate, consider checking for deficiency and recommending supplements.

In BPJ 15 (August 2008) we covered the topic of vitamin and mineral deficiencies. We received feedback that further information would be useful about what deficiencies a child eating a vegetarian diet would be at risk of.

Vegetarianism is becoming an increasingly popular dietary choice. A well-planned vegetarian diet can be healthy and nutritious for an adult but many families considering this diet for their children may seek advice on the safety of this practice.

Whether vegetarian or not, it is vital that children have a well balanced diet. This is particularly important in the pre-school years as this is a time of rapid growth and development.

Lacto-ovo is the most common type of vegetarian diet and describes someone who excludes meat from the diet but consumes eggs and dairy products.

Vegan describes someone who abstains from eating all animal products, sometimes even honey.

Vegetarian diets can be healthy and nutritionally adequate for children but food intake needs to be planned carefully to include adequate protein, iron, vitamin B12, folate, zinc, riboflavin and essential fatty acids that can be harder to obtain from plant sources.

Children and adolescents that follow a properly designed vegetarian diet grow and develop normally. In fact, studies have shown that children who follow a vegetarian diet have a lower intake of cholesterol and fat and a higher intake of fruit and vegetables and are leaner than children who have a non-vegetarian diet. A vegetarian diet adopted at an early age is also thought to be protective against diabetes, cardiovascular disease, hypertension and obesity in adult life.[1]

Most concerns about vegetarian diets in children surround vitamin B12, vitamin D and calcium deficiencies. A recent study of 215 adolescents found that those with a vegetarian diet had lower levels of serum vitamin B12.[2] Another study of 100 children found that a vegetarian diet was associated with an inadequate dietary intake of calcium and vitamin D, with potential implications on bone turnover rate.[3] However there are many non-vegetarian children with inadequate diets that are equally at risk from these deficiencies.

Energy

Young children need lots of nutrient dense foods for growth and energy. Sometimes a vegetarian diet is so bulky that a child can not eat enough to get the calories needed. A critical time is during the weaning stage when a baby is switching from high-fat, high-calorie mother's milk to a less calorific dense diet.

If some animal products are allowed in a child's diet such as eggs and dairy products then energy intake is not as much of a concern. However if parents wish to raise the child on a vegan diet, advice should be that they perhaps wait until the child is older and has better gastrointestinal capacity to eat the bulky volume of food required. Advice from a paediatric dietitian is highly recommended.

Protein

The main source of protein in a vegetarian diet is from eggs and dairy products. Plant sources include legumes (beans, peas, lentils), soy (tofu) and nuts. One cup of cooked beans has the same amount of protein as approximately 50g meat.[4] In general, children require two to three servings of protein per day. It may be difficult to get small children to eat adequate amounts of plant-based protein. Nuts also contain high calories so should not be used as a main protein source in the diet. Because amino acids have a lower absorption from plant foods, vegetarians may require a higher intake of protein (up to 30% more).[1, 5]

Iron

The best source of iron is red meat, but the iron content of a vegetarian diet can be adequate. Breakfast cereals (18%) and breads (12%) provide the greatest proportion of iron to the diet of New Zealand children.[6] Iron is also present in legumes, dried fruit, whole grains, soy foods and green leafy vegetables, although in a form (non-heme) which is harder for the body to absorb. In general, people eating a vegetarian diet require almost two times more iron daily than people who eat meat because of this difference. Vegetarian diets should include a source of vitamin C as this aids absorption of non-heme iron.[1, 4]

Iron is a very important nutrient for children and deficiency, through lack of iron-rich food in the diet, may result in anaemia. A small study looking at the dietary intake of vegetarian children aged 7 to 11 years compared with age-matched meat eaters, showed them to have significantly lower haemoglobin levels.[7] Supplementation with iron could be offered to a child presenting with iron-deficiency anaemia.

Vitamin B12

Vitamin B12 is especially important during periods of rapid growth in childhood. It is found naturally only in animal products, so children eating a vegan diet are at risk of deficiency. Vitamin B12 sources in a vegetarian

Vegetarian food sources of nutrients[5]

Nutrient	R.D.I (based on 10 year old child)	Food source	Amount per serve
Iron	8 mg/day	Tofu ½ cup	6.6 mg
		Pumpkin seeds ¼ cup	5.2 mg
		Soybeans ½ cup	4.4 mg
		Lentils ½ cup	3.3 mg
		Sesame tahini 2 Tbsp	2.7 mg
Zinc	6 mg/day	Pumpkin seeds ¼ cup	2.6 mg
		Navy beans (most baked beans) ½ cup	2.3 mg
		Soybeans, dry ½ cup	2.1 mg
Calcium	1000 mg/day	Bok choy 1 cup	167–188 mg
		Cheddar cheese 20 g	153 mg
		Yoghurt, ½ cup	137–230 mg
		Cows' milk ½ cup	137–158 mg
		Figs, dried 5	137 mg
Riboflavin	0.9 mg/day	Yeast flakes, 1 Tbsp	1.9 mg
		Egg, large	0.6 mg
		Almonds ¼ cup	0.3 mg
Vitamin B12	1.8 mcg/day	Yeast flakes, 1 Tbsp	1.5 mcg
		Egg, large	0.5 mcg
		Cows' milk ½ cup	0.4–0.5 mcg
Linolenic acid (omega-3)	1.0–1.2 g/day	Walnuts ¼ cup	2.7 g
		Flaxseed oil, 1 Tbsp	2.7 g
		Canola oil, 1 Tbsp	1.3–1.6 g

diet include milk, eggs, soy milk, yeast extract and fortified cereals. Children who do not eat enough of these foods are recommended to take a vitamin B12 supplement.

Calcium

For children on a lacto-ovo vegetarian diet, calcium intake may actually be higher than non-vegetarians due to the dependence on dairy products for calories and protein. However the diets of vegan children have been found to meet only 40% of a child's calcium needs.[7] Non-dairy sources of calcium include calcium fortified cereals, soy foods, legumes and some green vegetables (e.g. bok choy, broccoli). Factors that enhance calcium absorption include adequate vitamin D and protein.[5]

Vitamin D

Very few foods naturally contain vitamin D. Fish such as salmon, tuna and mackerel, and cod liver oil are among the best sources. Small amounts of vitamin D are found in beef liver, cheese and egg yolks. Vitamin D is not permitted

to be added to breakfast cereals in New Zealand.[8] Levels of vitamin D found naturally in milk are very low and there is no mandatory fortification of milk, margarines or butters in New Zealand – only a few products have been fortified.

Another source of vitamin D is skin exposure to sunlight. Sun exposure to face and arms for 15 to 20 minutes per day is adequate. Children with darker skin require approximately three to four times more exposure to gain the same benefit.

Children who have inadequate sun exposure and are unable to consume enough vitamin D rich foods may require vitamin D supplementation.[4] Supplementation may be problematic for children following a vegan diet as vitamin D3 (cholecalciferol) is of animal origin (from irradiation of animal skins or sheep lanolin). Vitamin D2 (ergocalciferol) is a form acceptable to vegans, however it is less bioavailable than vitamin D3.[9]

Zinc

Zinc from animal products is more easily absorbed than zinc from plants. Children eating a vegetarian diet need up to two times more zinc to make up for the bioavailability difference. Plant sources of zinc include fortified grains, legumes, nuts and soy foods.[4]

Omega-3 fatty acids

Preformed long-chain omega-3 fatty acids are most commonly found in fish and eggs, therefore vegetarian or vegan diets may be deficient. Long-chain omega-3 fatty acids are able to be synthesised by the body from plant-based α-linolenic acid obtained from flaxseed oil, canola oil, walnuts and soybeans.[1] Children not consuming fish and eggs require increased amounts of α-linolenic acid.

Riboflavin

Riboflavin is a B group vitamin that is essential for the metabolism of fats, carbohydrates and proteins. Plant based sources include almonds, asparagus, bananas, legumes and yams. Dairy products, fortified cereals and soy milk may also provide riboflavin.

Bottom line

A vegetarian diet can be healthy for a child as long as it is well balanced and adequate amounts of essential nutrients and vitamins are consumed. In fact, researchers are currently trialling vegetarian diets as a management strategy for obesity in children. A vegan diet for a child is more complicated to manage in terms of gaining essential nutrients and vitamins. Prescribing multiple supplements for children to overcome dietary deficiencies is not as desirable as a well balanced diet. Parents should take this into consideration when making dietary choices for their child. Advice from a nutritionist should be sought.

In children with a vegetarian or vegan diet, consider the possibility of vitamin D, vitamin B12, calcium and iron deficiency; consider supplementation if the child is unable/unwilling to consume enough of these nutrients from dietary sources.

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