

Vegetarian diets in pregnancy, lactation, infancy and childhood

Vegetarijanska prehrana v času nosečnosti, dojenja, dojenčka in otroka

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Abstract

Strict vegetarian diet with avoidance of all foods of animal origin poses a risk of deficiency of several nutrients: iron, zinc, calcium, iodine, vitamin B₁₂, B₂, A, D, n-3 long chain polyunsaturated fatty acids, particularly docosahexaenoic acid (DHA, C22: 6n-3), proteins and energy. Guidelines of the European Society for Paediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN) and the Slovenian guidelines dissuade from strict vegetarian or vegan diet for children. However, in the majority of adolescents across Europe, including in Slovenia, markedly too low intake of vegetables is reported. The manuscript presents the benefits of plant-based foods in the prevention of obesity in children and adolescents. Other benefits of sufficient intake of plant-based foods include the prevention of cardiovascular diseases with the Mediterranean diet. While warning against very strict vegetarian diet in infancy, specially in children, adolescents, and pregnant and lactating women it is very important to promote plant-foods in the diet of omnivorous children and adolescents; this should become an important public health strategy.

Izvleček

Stroga vegetarijanska prehrana z izogibanjem vseh živil živalskega izvora pomeni tveganje za pomanjkanje več hranil: železa, cinka, kalcija, joda, vitaminov B₁₂, B₂, A, D, n-3 dolgoverižnih večkrat nenasičenih maščobnih kislin, zlasti dokozaheksaenojske kisline (DHA, C22: 6n-3), beljakovin in energije. Smernice Evropskega združenja za pediatrično gastroenterologijo, hepatologijo in prehrano (ESPGHAN) in slovenske smernice odsvetujejo strogo vegetarijansko ali vegansko prehrano za otroke. Večina mladostnikov v Evropi, tudi v Sloveniji, uživa občutno prenizke količine zelenjave. Članek predstavlja prednosti živil rastlinskega izvora za preprečevanje debelosti pri otrocih in mladostnikih. Prav tako so predstavljene druge zdravstvene prednosti zadostnega vnosa rastlinskih živil, zlasti preprečuje bolezni srca in ožilja na t. i. primeru sredozemske prehrane. Medtem ko je pomembno, da se odsvetuje zelo stroga vegetarijanska prehrana za dojenčke, otroke in mladostnike, nosečnice in doječe matere, je prav tako pomembno spodbujanje uživanja rastlinskih živil v t. i. vsejedi prehrani otrok in mladostnikov, ki bi morala postati pomemben del strategije javnega zdravja.

Introduction

For infants, children and adolescents, as well as for pregnant and lactating women, a balanced, mixed diet containing nutrients of plant as well as of animal origin is recommended.¹ Guidelines of the European Society for Paediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN) and the Slovenian guidelines dissuade from strict vegetarian or vegan diet for children.^{2,3} On

the contrary, the American Dietetic Association states that well-planned vegetarian diets are appropriate for individuals during all stages of the lifecycle, including pregnancy, lactation, infancy, childhood, and adolescence. For nutrients that are insufficient or absent in foods of vegetable origin, fortified foods or supplements can provide useful amounts of important nutrients.⁴

We published several manuscripts with an overview of critical nutrients in the diet

of vegetarian infants, children, adolescents as well as pregnant and lactating women. We also published a list of laboratory investigations that need to be carried out for the determination of specific nutrient deficiencies and the practical recommendations for vegetarian diet of children.^{5,6,7,8,9}

The current manuscript emphasizes the benefits of plant foods as part of a well-balanced diet.

Risks of strict vegetarian diet for infants, children, adolescents and pregnant and lactating women

The avoidance of all foods of animal origin (meat, fish, eggs, milk and honey) is a risk for deficiency of several nutrients: iron, zinc, calcium, iodine, vitamin B₁₂, B₂, A, D, n-3 long chain polyunsaturated fatty acids, particularly docosahexaenoic acid (DHA, C₂₂: 6n-3), proteins and energy.^{10,11,12} Sufficient intake of DHA through diet (predominantly sea fish) or dietary supplements during pregnancy and lactation is very important, as it influences the DHA content in human milk.^{13,14,15,16}

Younger the child and more restricted the diet, higher is the risk for nutritional deficiency with negative side effects on health.^{8,9} In children aged 2–18 years on a vegetarian diets, inadequate intakes of energy, protein, calcium, zinc, iron, vitamin B₁₂, and vitamin D may occur, due to a poor choice of foods and because of high nutritional requirements related to growth and development.¹⁷

Too low intake of vegetables in adolescents

In Germany, Norway, Belgium, Central and Eastern Europe adolescents were found to consume too low amounts of vegetables.^{18,19,20,21} In a national representative study, which was part of a larger Slovenian project on iodine supply and endemic goitre,^{22,23} we investigated dietary habits of Slovenian adolescents aged 15–16 years (n = 2,813).^{24,25,26,27} We investigated the food intake of Slovenian adolescents and com-

pared it with food-based dietary guidelines developed for children and adolescents.^{26,28} The greatest deviations from the recommended intakes of the main food groups were significantly lower intakes of foods of vegetable origin in both genders. Comparing the mean intakes of the main food groups with the recommended, Slovenian boys did not meet the minimum recommendations²⁸ for: vegetables (179 vs. recommended 350 g/day), fruits (321 vs. 350 g/day), bread/cereals (271 vs. 350 g/day), potatoes/ rice/pasta (212 vs. 280 g/day) and oils/fats (14 vs. 45 g/day). On the other side their consumption of certain food groups was significantly higher than recommended: meat/meat products (126 vs. 85g/day) and fish/fish products (46 vs. 30 g/day). Girls had significantly too low intake of vegetables (163 vs. 300 g/d), bread/cereals (226 vs. 280 g/d), potatoes/ rice/pasta (163 v. 230 g/d) and oils/fats (16 v. 40 g/d). Of major concern in the food intake of Slovenian adolescents is the extremely low intake of vegetables. Only 11 % of boys and 10 % of girls consumed the recommended amount of vegetables.²⁶ The intake of fiber was sufficient in both genders; however they consumed too low amounts of folate. Folate is mainly found in vegetables, whole grains, beans, and breakfast cereals,²⁹ all of which are consumed in too low amounts by Slovenian adolescents.²⁷

Food policies should support social marketing messages to promote plant-based dietary patterns.³⁰

Benefits of plant-based foods in the prevention of obesity in children and adolescents

Plant-based diets have low energy density and high content of complex carbohydrates, fibre, and water, which may increase satiety and resting energy expenditure. In the comment on the role of nutrition-related factors on obesity prevention in children aged 2 to 18 years, the ESPGHAN Committee on Nutrition emphasizes that no specific recommendations for macronutrient intakes to prevent obesity can be made. It recommends that plant foods can be the main

food contributors to a well-balanced diet. When a vegetarian diet is practised, appropriate planning (taking into account recommended macro- and micronutrient intakes) and monitoring (growth, zinc, iron, vitamin B₁₂, and vitamin D) should be undertaken by health care professionals. It also recommends the promotion of plain water as the main fluid source for children, instead of sugar-sweetened beverages (flavoured/enhanced waters, ice tea, sports drinks, energy drinks, sweetened carbonated beverages, including soda, fruit drinks, fruit nectars, syrup beverages and sweetened tea).^{31,32} Children should eat at least 4 meals daily, including breakfast. Regular family meals should be encouraged. Consumption of fast food with large portion sizes and high energy density is dissuaded. Healthy food options should be promoted with portion sizes appropriate for age and body size. Education aimed at the prevention of obesity should be included in the routine care of children by health care professionals.¹⁷

Two recent reviews investigated the relation between plant food and childhood obesity.^{33,30} Newby concluded there was no relation between childhood obesity and fruit and vegetables; insufficient evidence regarding beans, legumes, and soy; and slight protection with grains and breakfast cereals, fibre, and plant-based dietary patterns.³³

Sabate⁷ and Wien found that plant foods were either protective (cereals, legumes, and nuts) or showed no association (fruit/vegetables and vegetable protein products), whereas animal foods (meats and dairy products/eggs) were associated with an increased risk of overweight.^{30,17}

Other benefits of sufficient intake of plant-based foods

Diets that feature the regular sufficient intake of fruit and vegetables are low in energy density, protein, and fat and high in nutrient density, complex carbohydrate, fiber, and water. Many beneficial effects of fruits and vegetables are owing to their high contents of essential nutrients and phytochemicals, low energy density and low glycaemic load.

These have a significant role in the protection against chronic diseases.^{34,35}

The traditional Mediterranean diet is characterized by a high intake of olive oil, fruit, nuts, vegetables, and cereals; a moderate intake of fish and poultry; a low intake of dairy products, red meat, processed meats, and sweets; and wine in moderation, consumed with meals.³⁶ In a recent randomized primary prevention trial, the efficacy of two energy-unrestricted Mediterranean diets were tested in adults, one supplemented with extra-virgin olive oil and another with nuts, as compared with a control diet (advice on a low-fat diet). Foods recommended in the Mediterranean diets were: olive oil (≥ 4 tbsp/day), tree nuts and peanuts (≥ 3 servings/wk), fresh fruits (≥ 3 servings/day), vegetables (≥ 2 servings/day), fish (especially fatty fish)/seafood (≥ 3 servings/wk), legumes (≥ 3 servings/wk), sofrito (olive oil sauce made with tomato, onion/garlic, aromatic herbs; ≥ 2 servings/wk), white meat instead of red meat and wine with meals (optionally, only for habitual drinkers; ≥ 7 glasses/wk). Foods discouraged in the Mediterranean diets were: soda drinks (< 1 drink/day), commercial bakery goods, sweets, and pastries (< 3 servings/wk), spread fats (< 1 serving/day) and red/processed meats (< 1 serving/day). The results support the benefits of both versions of the Mediterranean diet for the primary prevention of cardiovascular disease.³⁵

Conclusion

The avoidance of all foods of animal origin poses a risk for deficiency of several nutrients such as: iron, zinc, calcium, iodine, vitamin B₁₂, B₂, A, D, DHA, proteins and energy. Strict vegetarian or vegan diet for children is dissuaded by the ESPGHAN as well as the Slovenian guidelines. On the other hand, the diet of adolescents with too low intake of vegetables and foods of vegetable origin raises concern. Actions to stimulate intake of foods of plant origin, especially of vegetables would be of benefit.

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