



The role of vitamin and mineral supplements in children

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Introduction

Children undergo significant social, cognitive and physical development during their pre- and primary school years. It is therefore important that they have a sufficient intake of nutrients to support this growth and allow them to lead active, healthy lives. Nutrients such as iron, calcium, zinc, folate, as well as vitamins A, D, and B complex are central to this development.¹ If children are able to follow a healthy diet, there is no need for them to take vitamin and mineral supplements.^{1,2} However, in cases where this is not possible, or a child has increased nutritional needs due to deficiency or illness, supplements may be beneficial.³

Energy and protein

Toddlers and children are in a state of constant growth, developing teeth, bones, muscles and other tissues. To support this growth, children need more nutritious food in proportion to their body size than adults do.¹ A balanced intake of energy and protein is essential for ensuring health and everyday function. A low intake of energy (sourced mainly from carbohydrates) can cause the breakdown of lean muscle, while an intake that is too high may cause excessive weight gain. Energy imbalances may result in significant health problems. For this reason, a balanced diet, rich in low glycaemic index (GI) and high-fibre foods, is recommended. Protein plays an essential role in body growth and should make up between 5–30% of a child's total energy (depending on their age and body size). Protein needs are highest between the ages of one to three years at 1.05 g of protein/kg body weight per day and 0.95 g/kg/

day thereafter. Energy and protein supplements (in the form of powders, shakes, meal supplements) are only needed if a child is underweight or suffers from a chronic illness.¹

Iron

Iron is essential for the optimal physical and cognitive development of growing children.² It is responsible for supporting the rapid increase in blood volume that occurs between infancy and childhood.¹ Inadequate iron intake is one of the most prevalent nutrient-related problems in children. This is particularly true for children between the ages of one to three, who are unable to reach their daily recommended intake (DRI) of iron (7 mg iron/day). Furthermore, a severe lack in iron results in iron-deficiency anaemia, a condition characterised by low amounts of red cells in the blood.¹ This condition may permanently impair brain function, which is why low iron status is associated with poorer performance in school and delayed motor-skill development.^{1,4} If a diet rich in meats, fortified cereals and dark leafy vegetables is followed, iron deficiency and anaemia can be avoided.² Iron supplementation is only necessary in cases where children do not have access to a variety of foods and are unable to follow a balanced diet.^{1,2} In cases where the child follows a vegetarian or vegan diet, iron supplementation in the form of a multivitamin may be beneficial.²

Calcium and vitamin D

The DRI of calcium for children between one to three years of age is 700 mg/day and increases to 1 000 mg/day for children four to eight years of age. This nutrient is famous for the role it plays in proper mineralisation and maintenance of bones in growing toddlers and children.^{1,2} Calcium is found in milk and dairy products, as well as in some vegetables and fortified cereals.² It is important to note that calcium can only be properly absorbed and used in the body if vitamin D requirements are met. Food sources of vitamin D include eggs, tuna and cheese. However, it is possible to acquire enough vitamin D by simply exposing the skin to the sun for at least 10 to 15 minutes per day.² Although we live in sunny South Africa, children no longer spend as much time outdoors as

they used to. If children lack a diet rich in calcium and vitamin D and do not spend enough time outdoors, deficiency may result. Severe calcium and vitamin D deficiency causes the softening and delayed development of bones, resulting in a disorder known as rickets.⁵ In cases where children are at risk of deficiency, supplementation may be beneficial. On the other hand, children who are nutritionally healthy should not take calcium or vitamin D supplements as excess levels may be harmful.^{2,6}

Zinc

It is essential that children consume adequate levels of zinc through their diets. The DRI ranges between 3–5 mg zinc/day depending on the child's age and can be sourced from meat products, seafood and legumes. Zinc plays an important role in immunity and growth in young people. Children who are zinc deficient often experience loss of taste, slow growth, poor wound healing and a higher risk of illness.¹ Children that follow restrictive diets or suffer from certain immune-related illnesses may have increased zinc requirements and would be advised to take supplements.

Vitamin A

An adequate vitamin A status has been proven to prevent illness and promote health due to its role in maintaining immunity, red blood cell production, growth and cellular function.⁷ Vitamin A is best known for its role in maintaining healthy eyesight. Chronic vitamin A deficiency is associated with night-blindness and can lead to permanent loss of vision. Children should include foods such as yellow-orange vegetables, meat and eggs in their diet to meet the DRI of 300–400 µg of vitamin A/day. If vitamin A is taken in extremely high amounts, toxic effects may occur. It is important to ensure that vitamin A supplements are absolutely necessary before using them.

Vitamin and mineral supplements

It is a common practice for parents to give their children multivitamins throughout their school years. However, there

is little evidence to support that giving healthy children routine vitamin and mineral supplements has any health benefits.^{1,8} For children who are chronically ill, suffer a known nutrient deficiency or follow a restricted diet that limits their consumption of food groups (e.g. animal products), supplementation may be beneficial. If a child requires a supplement, a multivitamin containing no more than the DRI of any particular nutrient is recommended. If certain nutrients are taken in excess (particularly vitamins A, D, E and K), toxic side-effects and health disorders can develop. This is more likely to occur with the use of single nutrient supplements than in multivitamin supplements designed for children.^{1,2}

Conclusion

Adequate nutrition is essential to ensure the optimal growth, development and health of children. All nutritional needs can be met by following a healthy, balanced diet. For this reason, only children suffering from illness or nutrient deficiency may require vitamin and mineral supplementation.

References

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