Vegetarian Diet and Breastfeeding

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Abstract

The vegetarian diet is becoming mainstream in North American culture due to its perceived healthiness and decreased environmental impact. The superiority of breast milk over infant formula has been documented within both the published literature and popular media and has made breastfeeding the feeding method of choice for newborns. Due to breast milk composition, breastfeeding vegetarian women and their infants must take vitamin supplements to promote optimal health and infant development. Supplementation is needed because essential nutrients are lacking or absent from the diet and breast milk of vegetarian mothers. For mothers who follow a meatless diet, breast milk contains extremely limited amounts of vitamin D and vitamin B₁₂ (also known as cobalamin) and low levels of iron and protein as these nutrients are not metabolized from plants ingested in vegetarian diets.
Vegetarian Diet and Breastfeeding

The origins of vegetarianism, the practice of following a plant-based diet, have been traced back to Ancient Greece and India. Bone analysis of prehistoric remains has shown *Homo sapiens* ate diets low in animal substrates (Eaton, Eaton III, & Cordain, 2002). Today there are many varieties of vegetarianism that range from ‘vegetarians’ who do not eat meat and avoid animal derived by-products to ‘lacto-ovo’ vegetarians who eat only eggs, milk, and honey. In contrast, ‘vegans’ exclude from their diet all animal flesh and products tested on animals while ‘raw’ vegans eat only fresh and uncooked fruits, nuts, and vegetables. For the purpose of this paper, the term vegetarian includes any diet that either excludes, or includes only a minimal amount of mammalian food sources (The Vegetarian Resource Group, 2010).

**Benefits of Breastfeeding**

Breastfeeding is generally accepted as the gold standard of infant nutrition and is recommended for at least the first six months of life (Canadian Nurses Association [CNA], 2008; Canadian Pediatric Society [CPS], 2007; World Health Organization, 2003). Recently the Canadian Nurses Association (CNA) endorsed the World Health Organization’s (2003) Global Strategy for Infant and Young Child Feeding statement that breastfeeding gives infants the best possible start in life (CNA). Breast milk is individually tailored to baby needs and is associated with decreased rates of asthma, gastroenteritis, and otitis media as well as higher levels of development and intelligence (Beal, Kuhthau, & Perrin, 2003). Additionally, breastfeeding benefits the mother by promoting more rapid and increased uterine tone; faster postpartum weight loss; delayed ovulation/menstruation; and decreased risk of breast, ovarian, and endometrial cancers (Guise et al., 2003).
Composition of Breast Milk

While breast milk is composed of everything baby needs, these nutritional elements must already exist within the mother in order to be passed on to baby. For a woman who eats a well-balanced omnivorous diet, milk composition is not an issue as meat contains proteins (amino acids) and vitamin B₁₂. Diets that also contain cow’s milk are an excellent source of protein, saturated fat, vitamin D (VTD), and long chain polyunsaturated fatty acids (more commonly referred to as arachidonic acid [ARA] and docosahexanenoic acid [DHA]) (Agostoni et al., 2008). All of these nutritional elements are essential for normal human development.
Conversely, without supplementation, vegetarians can easily be deficient in several of the aforementioned nutrients such as vitamin B₁₂, VTD, calcium, energy, and protein. Any deficiencies can lead to infant growth retardation, fat and muscle wasting, and slower psychomotor and cognitive development (Agostoni et al., 2008).

Energy

Depending on their pre-pregnancy weight, women are often encouraged to slightly increase their caloric intake during pregnancy to meet the increased demands of fetal growth and energy reserves for breastfeeding after birth. Carbohydrates are a dietary source of energy at 4 kcal/g (proteins provide 4 kcal/g of energy and fats provide 9 kcal/g of energy when metabolized) that are important to vegetarian caloric intake (Mattson Porth, 2004). Although the vegetarian diet is usually rich in carbohydrates, the need to develop energy reserves increases demand for more calories. Both vegetarian and non-vegetarian mothers need to establish energy reserves to have sufficient energy level for breastfeeding during the postpartum period (Wilson & Pugh, 2005).
Protein

Proteins are the building blocks of the body and in their simplest form are known as amino acids. All essential amino acids are found in food from animal sources, with rice being the only plant source to contain all essential amino acids but in very low quantities (Wilson & Pugh, 2005). Without adequate amounts of protein the body is unable to synthesize muscle tissue, enzymes, hormones, and antibiotics (Wilson & Pugh). Agostoni et al. (2008) reported that animal proteins, compared to plant proteins, are associated with positive psychomotor development indices for infants and young children. Presumably the better indices with animal protein are due to the minerals such as iron, zinc, and essential fatty acids (such as ARA) contained in animal protein. The same researchers also noted that because breast milk (from both vegetarian and non-vegetarian mothers) is low in iron, prolonged exclusive breastfeeding has been associated with iron deficiency anemia (Agostoni et al.).

Fats and Fat-Soluble Vitamins

In an age when obesity is of epidemic proportion and fats are the ‘bad guys’ of nutrition, one must emphasize that fats are a crucial part of a healthy diet as they aid in the absorption and transportation of fat-soluble vitamins A, D, E, and K (Blanchard, 2006). These fat-soluble vitamins are needed in small amounts to assist in the healthy development of eyes and bones, act as antioxidants to protect cell membrane integrity, and in the case of vitamin K assist in blood clotting (Anderson & Young, 2008).

VTD is a fat-soluble vitamin that naturally occurs in oily fish and fish oils, sun-dried shiitake mushrooms and is synthesized by the skin when exposed to ultraviolet B (UVB) light (Schwalfenberg, 2007; Walker & Modlin, 2009). VTD can also be found in fortified foods (usually dairy products) and supplements. A woman who does not consume these food sources and has decreased sun exposure (i.e. lives in a northern climate, or belongs to a culture that
requires the body to be covered) will have insufficient VTD stores to transfer any to her child prenataally or to her breast milk (CPS, 2007).

Fats that have also received a lot of attention in relation to infant nutrition are ARA and DHA (omega 6 and 3 respectively). These fatty acids are vital to vision and brain development (Agostoni et al., 2008). Unfortunately these fatty acids are found in very few sources; the most accessible being fatty fish (salmon) and DHA enriched eggs. The vegan diet contains essentially no ARA and DHA as plants touted to have fatty acids (such as hempseed, rapeseed, flaxseeds, soy beans, and walnuts) are poorly converted into DHA by the body (Blanchard, 2006).

**Water-Soluble Vitamins**

The water-soluble vitamins, B complex (the building blocks of our neurological system) and vitamin C, have variable levels within the body depending on intake and are easily transferred from serum to breast milk. Vitamin B₆ is found in highest levels in pork and eggs and to lesser amounts in cereal, oatmeal, and legumes (Wilson & Pugh, 2005). Vitamin B₁₂ is only found in animal sources (Mariani et al., 2009) and levels are not maintained by vegetarian mothers without fortification or supplementation. Lack of vitamin B₁₂ can lead to neurologic defects/impairment that can manifest in failure to thrive, developmental delay, neurologic/psychiatric issues, and hematologic abnormalities (Wilson & Pugh). Because Vitamin C is found in a variety of fruit sources vegetarians can easily consume adequate amounts of this nutrient.

**Minerals**

The minerals most commonly found in human milk are calcium, magnesium, and zinc. According to Wilson and Pugh (2005), these minerals are most likely to be lacking in a woman’s diet whether she is vegetarian or not. Calcium can easily be added to breast milk by eating dairy
products, leafy greens, and nuts. Magnesium and zinc levels of breast milk cannot be increased by maternal diet alone and consequently the infant must ingest them directly (Wilson & Pugh).

**Vitamin B\textsubscript{12} and Vitamin D Deficiency**

Vitamin B\textsubscript{12} and VTD are the most commonly cited deficiencies for vegetarian mothers who breastfeed because the potential outcomes for these deficiencies are serious if left untreated.

**Vitamin B\textsubscript{12} Deficiency**

Gastric or intestinal malabsorption, inadequate intake, drugs, or congenital metabolic disorders can cause Vitamin B\textsubscript{12} deficiency, however it is most commonly found in infants of breastfeeding vegetarian mothers with a dietary deficiency (Cetinkaya et al., 2007). For affected infants, symptoms may include delayed growth, failure to thrive, developmental delay, macrolytic anemia, and cerebral atrophy (Casella, Valente, Medeiros de Navarro, & Kok, 2005; Centers for Disease Control, 2003). If vitamin B12 deficiency is caught early enough and treated with vitamin supplementation, rapid improvement can occur. However, Casella et al. noted one case where B\textsubscript{12} deficiency was not caught and treated until the child was 32 months old and the child was diagnosed as “…mentally retarded” three years later (p.594).

**Vitamin D Deficiency**

Vitamin D is important as it works with calcium and phosphorus to build strong bones and teeth. Vitamin D deficiency in children is linked to rickets and the flattening of the back of the skull (Anderson & Young, 2008). Vitamin D deficiency is also associated with an increased risk of cancer, autoimmune disease, hypertension, and infectious disease (Anderson & Young; Mariani et al., 2009; Schwalfenberg, 2007; Walker & Modlin, 2009). Unfortunately, in the developed world, vitamin D deficiency is most commonly diagnosed in exclusively breastfed infants of vegetarian mothers with vitamin deficiency (Baatenburg de Jong et al., 2005; Cetinkaya, Yildirmak, Kutluk, & Erdem, 2007; and Mariani et al.). The infants identified by
Baatenburg de Jong et al. and the Mariani et al. were all admitted to hospital with failure to thrive, megaloblastic anemia, and delayed psychomotor development. In both studies, treatment with vitamin D supplementation showed improved nutritional and neurological status, although some minor deficiencies remained.

**Prevention**

Although non-treatment of these deficiencies results in dire and troublesome health consequences, these negative outcomes are very easily prevented. Therefore, a focus on prevention and maternal education is most important and effective in promoting optimal health of the vegetarian mother and her infant. Maternal intake of VTD can be increased by the addition of dairy products and some fish products in the omnivorous or lacto-ovo vegetarian mother, with the intake of vitamin enriched plant products (soy or rice milk) in vegetarian mothers, or vitamin supplements for mother and baby. All exclusively breastfeeding mothers are recommended to give their infants 1 ml or 400 international units (IU) of VTD drops daily to prevent deficiency (CPS, 2007). This infant supplement is especially important in northern latitudes where there are dramatically reduced hours of sunlight during the winter months.

Vitamin B₁₂ intake can be increased by consumption of fortified plant foods. However, as the daily recommended intake of 4 mg/day (Wilson & Pugh, 2005) is hard to meet via plant sources, oral medication or intramuscular injection may be needed to provide adequate maternal stores and levels. If maternal supplementation results in an adequate Vitamin B₁₂ level, infant supplementation is not recommended (Morin, 2004).

**Conclusion**

Promoting adequate nutrition is an essential role of the nurse in pregnancy and postpartum education. When nurses discuss the benefits of breastfeeding with mothers during the prenatal and/or postpartum period, it is vital to ask if the mother follows a special diet. If the
mother reveals she is a practicing vegetarian, the nurse should discuss the importance of ensuring adequate intake of vitamins B₁₂ and D. From the author’s experience, vegetarian women are usually very well informed of the nutritional content of their diets and actively engage in adequate intake of essential vitamins and minerals. Assessment of dietary intake is important regardless of vegetarian status as diet is an important issue overall. Any woman, due to allergies or food preferences, may not eat a well balanced diet that contains adequate essential vitamins, minerals and calories. This deficit can usually be easily remedied once the nurse helps the client develop greater awareness of dietary requirements.

From personal and work place experiences, I have found that mothers are often preoccupied with their diet during pregnancy and lactation and as such it is important that nurses promote breastfeeding as the gold standard of infant nutrition. Nurses should also perform dietary assessments on expectant mothers because certain diets, especially those of vegetarian origin, can lack crucial vitamins such as vitamins B₁₂ and D leading to preventable delays in growth and cognition. For these reasons, vegetarian mothers who breastfeed must vitamin supplement their diet, and their infants diet to promote infant health and development.
References


