Supporting vegans through pregnancy and lactation

Jo Barlow, Lecturer[1]

[1]School of Health & Sports Sciences, University of Suffolk, UK

Corresponding author: Jo Barlow, j.barlow@uos.ac.uk, 01473 338206

Abstract

This article gathers the current knowledge base around veganism and plant-based diets in pregnancy and infant feeding to explore how midwives can better support the increasing numbers of women and families who are embracing a plant-based lifestyle. People who identify as vegan are becoming increasingly common (The Vegan Society 2019). There has also been an increase in 'flexitarianism' and those adopting plant-based diets for health and/or environmental reasons (see Table 1). There is a need to consolidate the nutritional guidance to enable better and more consistent evidence-based support for these groups.

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Abstract

This article gathers the current knowledge base around veganism and plant-based diets in pregnancy and infant feeding to explore how midwives can better support the increasing numbers of women and families who are embracing a plant-based lifestyle. People who identify as vegan are becoming increasingly common (The Vegan Society 2019)**. There has also been an increase in 'flexitarianism' and those adopting plant-based diets for health and/or environmental reasons (see Table 1). There is a need to consolidate the nutritional guidance to enable better and more consistent evidence-based support for these groups.**

Keywords

Pregnancy; Nutrition; Vegan; Veganism; Flexitarianism; Plant-based; Infant Feeding.

Overview

The number of British people who identify as vegan has quadrupled in the last 5 years (The Vegan Society 2019). Indications are that nearly half of UK vegans made the change in 2018 (Vegan Trade Journal 2018), suggesting that veganism is not only growing but growing rapidly. Vegans represent a small minority of the population constituting only 1.16% (The Vegan Society 2019) but there has been a rise in interest in 'flexitarianism' (see Table 1) and reduction in consumption of meat and dairy products more generally over recent years (YouGov 2019). UK supermarkets are reporting substantial increases in the demand for plant-based options (Lupica 2017; Sainsbury's 2019) with Sainsbury's noting a 65% increase in sales of plant-based products year-on-year and predicting that a quarter of Britons will identify as vegetarian by 2025 and half as flexitarian (Sainsbury's 2019). There

is a need for midwives to consider the current research around nutritional guidance for this fast-growing group in order to provide up-to-date, evidence-based direction.

Background

Drivers for the widespread shift to plant-based eating stem from ethical, health and environmental arenas. Environmentally, studies indicate that animal agriculture uses the majority of the world's farmland whilst only providing 18% of the calories consumed and that reduction or elimination of animal products may be the single biggest way to reduce environmental impact (Poore and Nemecek 2018). Livestock farming may also contribute an estimated 18% of total greenhouse gas emissions (Food & Agriculture Organisation of the United Nations 2006). The UK Government's Committee on Climate Change recently called on consumers to reduce their meat and dairy intake by a minimum of 20% in order to meet the Government's net zero target by 2025 (Committee on Climate Change 2020).

In addition to these environmental drivers, there is a growing body of evidence suggesting animal products may be detrimental to human health. The World Health Organisation reported in November 2015 that it had categorised processed meat as a group 1 carcinogen and red meat as group 2A (WHO 2015). Following this, published studies have indicated that plant-based diets may be beneficial to human health in prevention of conditions such as diabetes and cardiovascular disease (Aune et al. 2017; Bechthold et al. 2019; Hyunju et al. 2019; Kahleova et al. 2019; Qian et al. 2019). It is easy to see how a sea-change in our approach to human nutrition is underway, and this is before ethical considerations are taken into consideration.

Whilst nutrition in general is crucial in the part it plays in relation to good health, maternal nutrition both during and before pregnancy is significant for its effect on the health of both mother *and* infant (WHO 2016). Maternal diet impacts on an infant's immediate health as well as on overall childhood growth and wellbeing (Geraghty et al. 2018). More significantly, epigenetic research indicates that

maternal nutrition constitutes one of the environmental factors influencing the expression of genes in utero, increasing the fetus's susceptibility to chronic disease into adulthood and beyond (Mandy and Nyirenda 2018).

As health professionals, it is essential that we are able to adapt and respond to changing human diets with evidence-based advice, not only to assure health but to adhere to regulatory demands regarding individualised care (NMC 2018). Counselling individuals in relation to their nutrition is a significant part of the role of the midwife and there is at present, an absence of clear guidance around counselling the growing number of people who identify as vegan or plant-based through pregnancy and breastfeeding.

But, is it safe?

Historically, reports have surfaced expressing concerns about the nutritional sufficiency of a vegan diet through pregnancy and breastfeeding (Gambon et al. 1986; Kühne et al. 1991; Ciani et al. 2000) though these are largely attributed to case studies focusing on families following extreme and/or restrictive diets that cannot be described as "well-planned". Similar concerns have been raised for extreme or restrictive omnivorous diets. The British Dietetic Association (BDA) position is that a well-planned vegan diet can support health throughout the human lifecycle (BDA 2017a). This is echoed in guidance from the NHS (2018 Sep 3) and the World Health Organisation (WHO 2001). There is, however, an absence of direction from the National Institute for Health & Care Excellence (NICE), the Royal College of Midwives (RCM) or the Royal College of Obstetricians and Gynaecologists (RCOG) regarding plant-based diets in pregnancy and lactation.

General Nutritional Recommendations

NICE (2008) make reference to the importance of vitamin D and folic acid supplementation in its clinical guidance for uncomplicated pregnancies. It also recommends that all women are given diet and nutrition information at booking by their midwife and directs midwives to signpost women to

the Healthy Start programme for those who qualify. A maximum of an extra 200 calories per day are recommended in the third trimester of pregnancy (start4life 2020a) though no guideline is given for breastfeeding (start4life 2020b). NICE further recommends 5 portions of fruit and vegetables a day and 1 portion of oily fish a week (NICE 2015). Specific nutritional recommendations in breastfeeding are not given, with the same general dietary guidelines recommended (British Nutrition Foundation 2018; NHS 2018). The guide below discusses these recommendations in the context of a vegan or plant-based diet.

Nutritional Considerations for Vegans

Folic Acid

Folic acid is the synthetic form of folate, or vitamin B9, essential for the formation of red blood cells. Folic acid is known to decrease the risk of neural tube defects in the fetus and women in the UK are recommended to take a daily 400mcg folic acid supplement when planning a pregnancy or on discovering they are pregnant. This should be continued throughout the first trimester while the foetal spine is formed. Women at increased risk of neural tube defects are recommended to take an increased dose of 5mg (NICE, 2008).

Good sources of folate include dark leafy greens, legumes and beans, whole grain foods, oranges and orange juice. Vegans and those on a plant-based diet may well have relatively high folate intakes compared to omnivores, particularly if they eat a varied whole-food and minimally-processed plant-based diet (Schüpbach et al. 2017). Dietary doses are variable however, and as such vegans should be directed to supplement throughout the first trimester of pregnancy with the same dose as non-vegans.

Calcium and Vitamin D

Calcium requirements may be higher in pregnancy (Kovacs 2019) though there is no distinction in government guidelines for this with the daily recommended intake set at 700mg for all women

between the ages of 19 and 64 (Public Health England 2016). Calcium needs of vegans can be met in pregnancy by eating a diet rich in green leafy vegetables, cruciferous vegetables (e.g. cauliflower, cabbage, kale and broccoli), sesame seeds, almonds and dried fruit. Calcium-set or calcium-fortified products are also good sources (e.g. tofu, plant-based yoghurts or milks, soya products and some breads and orange juices).

Vitamin D (which enables calcium absorption) is mostly obtained through exposure to sunlight where it is formulated in the skin. It is necessary for bone growth and development for mother and foetus alike. It is difficult to obtain sufficient amounts of vitamin D through diet alone. NICE guidance recommends vitamin D supplementation (10mcg/day) throughout pregnancy and lactation from first contact with a healthcare professional (NICE 2017). This recommendation is no different for vegan or plant-based women however, Vitamin D3 (cholecalciferol) is commonly derived from animals via grease extracted from sheep's wool. Vegans can instead obtain supplementation from vitamin D2 (ergocalciferol) or vegan vitamin D3 which is grown on lichen. Currently, 'Healthy Start' vitamins contain animal-derived vitamin D3.

Vitamin B12

Vitamin B12 is essential for nervous system function and deficiency can cause neurological problems and anaemia. It is even more important in pregnancy when demands for B12 are higher (Balcı et al. 2014). Contrary to popular belief, vitamin B12 is produced by anaerobic micro-organisms, not by either animals or plants. Animals are exposed to B12-producing bacteria encountered in grazing or else through supplemented feed. Historically plants would have had similar exposure to these organisms in the soil but modern hygiene practices combined with depletion of soil bacteria mean that plants are no longer viable sources. Vegans should therefore ideally take a daily supplement. Government guidelines suggest a recommended intake of 1.5mcg per day (Public Health England 2016) but there is no defined upper limit and no identified toxic effect associated with excess intake (Siddiqua et al. 2016). As such supplemental doses are often much higher and vegans should be

assured that either a daily (10mcg) or weekly (2000mcg) dose is appropriate in pregnancy (BDA 2019). Fortified foods can be used as an alternative (e.g. fortified plant milks, breakfast cereals and nutritional yeast flakes) though again, dietary doses are more difficult to assure.

Omega 3

Essential omega-3 fats (alpha-linolenic acids or ALAs) are obtained through dietary sources as our bodies cannot make them. They are converted to polyunsaturated fatty acids (PUFAs) such as eicosapentaenoic and docosahexaenoic acids (EPA/DHA). These contribute to proper function of the immune system, brain, nerves and eyes. Good intake of omega-3's in pregnancy has been associated with a decrease in the incidence of pre-term birth and low birthweight babies (Middleton et al. 2018).

Good plant-based ALA sources include ground flaxseeds and flaxseed oil, chia seeds, walnuts and soya beans (BDA 2019). A tablespoon of ground flaxseeds a day can be added to a smoothie, a bowl of porridge or soup to ensure a daily source. Vegans may also choose to take a DHA/EPA supplement derived from algae rather than fish, though there is currently no research regarding the effect of algal supplementation.

Iodine

This trace mineral regulates production of thyroid hormones. A moderate to severe decrease in iodine in pregnancy can increase risk of miscarriage, low birth weight and overall infant morbidity and mortality (Eastman et al. 2019). The impacts of a mild deficiency in pregnancy are less clear though this has been associated with neurodevelopmental impairment and UK-based studies suggest deficiency is becoming more common (Bath et al. 2014; Knight et al. 2017).

Vegans can obtain iodine through dietary sources such as nuts, cereals, grains, bread and fortified plant milks. It is also present in variable quantities in fruits and vegetables though this depends on the amount available in the soil in which the plant was grown. Iodine is also found in many pre-natal

vitamin formulations though not in all and notably not in the formulation given out to those receiving Healthy Start vouchers. Vegans (as well as non-vegans) can be encouraged to take a daily pregnancy multi-vitamin and check that they are taking a formulation that includes iodine. This may be listed as 'potassium iodide' in the vitamin ingredient listing and should ideally meet the agreed minimum 150 mcg recommendation (BDA 2016a). Regular consumption of iodine-containing seaweeds, such as kelp, should be avoided as doses are variable and can easily result in excessive intake which may impair thyroid function (Leung and Braverman 2014).

Iron

Iron deficiency is a cause for concern in pregnancy in view of increasing iron requirements making anaemia a common occurrence; prevalence in pregnant UK women is nearly 1:4 (Barroso et al. 2011). This becomes even more significant for women carrying twins or multiples when iron needs are increased and anemia more common (NICE 2019). The iron content of vegan and plant-based diets may be higher than omnivorous diets (Collings et al. 2013) however the form of iron is derived in a non-haem form. This can be more difficult to absorb than the haem form found in animal products and whilst non-haem forms are protective against iron overload and cardiometabolic disease, higher general iron intake for vegans is generally indicated.

Iron-rich foods in a vegan diet include whole-grain foods, soya products, beans, nuts, seeds and green leafy vegetables (these are also high in essential zinc). It is also notable that cooking and/or eating iron-rich foods with vitamin-C containing foods (such as broccoli, peppers, tomatoes, oranges etc.) may considerably increase absorption.

Protein

The BDA advise eating two daily portions of protein-rich foods in pregnancy (BDA 2016b). Plant-based sources of protein are numerous with most whole plant foods containing some protein. As long as a varied and plant-based diet is followed that meets calorific needs, protein requirements will usually be met without issue (Schüpbach et al. 2017). Plant-based foods with the highest

amounts of protein include beans, peas, lentils, tofu, nuts and nut butters and seeds. Plant-based meat alternatives such as Quorn or soya-based burgers and sausages may also contain high levels of protein however, as with their meat counterparts, these are often highly-processed containing high levels of salt and fat and should be avoided or eaten in moderation.

Vegans and Infant Feeding

Nutrition in Breastfeeding

Largely, the same nutritional guidance stands during both pregnancy and lactation with three main exceptions; requirements for protein, zinc and calcium are markedly increased when breastfeeding and these requirements may be increased even further for those carrying twins or multiples though research on this is scant. The recommended daily intake of protein is 11g when breastfeeding (increased from 6g during pregnancy) (Committee on Medical Aspects of Food & Nutrition Policy 1991) though these requirements decrease after six months. Similarly, zinc requirements increase from 7 to 13mg per day when breastfeeding, falling to 9.5mg per day from four months. Helpfully, most protein-rich plant-based foods are also rich in zinc and consuming a reliable intake of wholegrains, soya, beans, nuts and green leafy vegetables should easily meet needs. Vegans may also wish to adopt food preparation techniques that decrease phytate content as this may impair zinc absorption (King 2000). Such techniques include soaking beans before cooking them as well as eating fermented foods such as sauerkraut.

Calcium needs increase from 700 to 1250mg per day during breastfeeding (BDA 2017b) and it is crucial that vegan breastfeeding women are aware of this increase so calcium-rich foods can be added to the diet. Examples of portion-based calcium-rich plant-based foods based on BDA guidelines (2017b) are given in Table 2 below.

As with non-vegans, vegans should be encouraged to supplement exclusively-breastfed babies with 8.5-10mcg vitamin D daily (SACN 2016) but as with pregnancy multivitamins, many contain vitamin-

D derived from an animal source. There are, however, commercially available brands that contain plant-based vitamin D2. Parents may wish to be aware however, that whilst these are suitable from birth, they may be in a 'multivitamin' format and contain vitamin supplementation of vitamins A and C in addition to D. Vegan breastfeeding mothers should also be encouraged to continue taking a daily multi-vitamin themselves to ensure sufficient vitamin B12 and iodine levels in breastmilk.

Formula Feeding

Vegans who choose not to breastfeed may need to know that there are currently no commercially-available vegan infant formula milks on general sale in the UK. Whilst there are milks that do not contain animal protein, the vitamin D within these products is derived from animals (First Steps Nutrition Trust 2020). Many vegans will therefore choose to breastfeed their babies and start them on an unsweetened calcium-fortified plant-based milk (such as soya, oat or nut milk) from the age of 1 year. This will provide nutritional parity to infants commencing on whole cow's milk (First Steps Nutrition Trust 2017).

Conclusion

Vegan and plant-based lifestyles are becoming more popular and with environmental and political drivers, they are likely to become more so. It is imperative that midwives provide women and families with evidence-based nutritional advice to support them through pregnancy and infant feeding, particularly when we consider the influence good nutrition can have on health and disease-prevention into adulthood and beyond. Well planned vegan diets are healthy in pregnancy and breastfeeding and professional nutritional advice is very similar to that given to non-vegans; no extra supplementation is required if a broad multi-vitamin is used. Midwives may, however, wish to familiarise themselves with plant-based sources of major nutrients so they can ensure vegans are consuming foods rich in these and are increasing intake of protein, zinc and calcium when breastfeeding.

Table 1 - Definitions

Vegan	**Someone who seeks to exclude animal-derived products for food, clothing or any purpose in order to avoid cruelty or exploitation of animals.**
Plant-based	A diet based mainly on foods derived from plants. Motivations often stem from pursuit of better health. Will not necessarily have objections to the use of animal products for clothing, toiletries, sport, entertainment etc.
Vegetarian	A person who does not eat meat or fish. Usually vegetarians eat dairy, eggs, honey and other animal-derived products.
Flexitarian	A person with a mostly vegetarian diet who occasionally eats animal products.

Table 2 – Calcium-rich Plant-based Foods

Food (portion)	**Calcium content**
Calcium-set tofu – 60g	200mg
Calcium-fortified soya yoghurt – 125g	150mg
Calcium-fortified plant-milks (e.g. soya, oat) – 100mls	120mg
Dried figs – 30g	75mg
Almonds – 30g	72mg
Broccoli – 100g	47mg

Box 1 - Key points

- Definitions of veganism, plant-based diets and flexitarianism vary and may encompass beliefs that touch on lifestyle, clothing and medication as well as diet.
- Guidance indicates that well-planned vegan and plant-based diets are safe during pregnancy and lactation.
- Midwives can guide vegans and those following a plant-based diet in pregnancy to eat a varied diet of whole and minimally-processed plant foods to encourage optimum nutrition alongside a pregnancy-specific multivitamin.
- As a minimum, vegans should be advised to take a pregnancy multi-vitamin that contains at least 150mcg of iodine (potassium iodide), 10mcg vitamin D2 (or vegan vitamin D3) and 10mcg vitamin B12.

- Vegans should be aware that most commercially-available multi-vitamins (including Healthy Start vitamins and vitamin D drops for breastfed babies) contain animal-derived vitamin D3 but that plant-based alternatives are widely available.
- Alternative sources of omega-3's might include the addition of a tablespoon of flaxseed a day or an algae-based DHA/EPA supplement.
- Encourage vegan women to ensure their diet contains multiple sources of dietary iron (e.g. beans, whole grains, nuts and seeds) and that these are eaten with vitamin-c containing foods to aid uptake of non-haem iron.
- Breastfeeding women should increase their daily intake of protein, zinc and calcium-containing foods.
- Vegans who wish to formula-feed should be aware that at present, there are no commercially-available vegan formula milks in the UK due to the presence of animal-derived vitamin D.

Box 2 - Further Resources

- **The Vegan Society** have published a detailed guide regarding nutrition in pregnancy and breastfeeding along with several detailed nutrient guides in conjunction with the BDA:
- https://www.vegansociety.com/resources/nutrition-and-health/life-stages/pregnancy-and-breastfeeding
- https://www.vegansociety.com/resources/nutrition-and-health/nutrients
- **First Steps Nutrition** have published professional guides on infant milks and nutrition guidance for vegan Mothers who are breastfeeding:
- https://static1.squarespace.com/static/59f75004f09ca48694070f3b/t/5a5a4935ec212dd5067a0622/1515866446317/Eating_well_Vegans_Oct_2017_final.pdf

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