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THE IMPORTANCE OF DIET IN PREGNANT WOMEN

Deborah Garida Nunes[1]*, Maria Gisele dos Santos[2] and Richard B. Kreider[3]

[1,2]Federal University of Paraná.
[3]Texas A&M University.

***Corresponding Author: Deborah Garida Nunes**
Federal University of Paraná

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SUMMARY
From conception to breastfeeding, the baby is totally dependent on the diet of the pregnant woman. This is because during pregnancy, the baby feeds on the nutrients absorbed and metabolized by the mother. In addition, the pregnant woman's eating habits still directly influence the variety, quality, and even the baby's taste, because the placenta can interfere with the baby's taste and smell (VITOLO, 2008; BLUMFIELD *et al*, 2012; HARREITER *et al*, 2019).

Diet in pregnant women

It is important to emphasize that during pregnancy, the woman should not go on a restrictive diet or lose weight during this period. Researchers have shown that this type of behavior can generate smaller babies with metabolic alterations. Thus, the diet should be as healthy and varied as possible, including fresh vegetables and fruits, grains and seeds, as well as whole grains, lean protein sources, and healthy fats. It is important to consume meals every 2.5 to 3 hours, in smaller quantities and chew food very well to facilitate digestion and avoid gastric discomforts such as reflux, heartburn, eructation and gas, as well as constipation (VITOLO, 2008; CARREIRO; CORREA, 2010; EMOND *et al*, 2018).

The meals should include all food groups, such as complex or whole carbohydrate, legumes, vegetables and fruits, AVB proteins and mono- and polyunsaturated fats. This care makes possible the intake of different nutrients that complement each other and provide sufficient substrate for the mother and baby's nutrition to be adequate (GOMES et al, 2019).

Regarding the distribution of macronutrients, calculated under the total energy value (TEV), 45 to 65% carbohydrates, 15 to 20% protein (adjusting for 10g or 1.1g/kg of pre-pregnancy weight/day, not exceeding an intake of 71g per day) and 20 to 35% lipids are recommended (ADA, 2008).

The American Dietetic Association (ADA) does not recommend diets that contain less than 130g/day of carbohydrates, which are harmful to maternal and child health. As for proteins, high biological value (HBV) proteins should be prioritized and their distribution should remain between 10% and 35% of the VET. In addition, the intake of saturated fats should be less than 7% of total lipids and cholesterol less than 200mg/day. The recommendations for vitamins, minerals, and fiber (20-35g/day or 14g per 1000 kcal) are similar for pregnant women with or without GDM. It is important to stress that the energy recommendation should promote adequate weight gain and restrictive diets are not recommended, as they may lead to ketonuria (FRANZ *et al*, 2002; ADA, 2004; ADA, 2008).

The RDA recommends a daily carbohydrate intake of 175g/day for pregnant women and 210g/day for lactating women. Protein intake is recommended at 1g/kg/day (calculated on pregestational or acceptable weight) with an additional 1g/day in the first trimester, 9g/day in the second trimester, and 31g/day in the third trimester. Of these, intake of at least 50% high biological value protein was recommended (IOM, 2005).

Good quality proteins or AVB are considered those from animal origin such as meat and poultry, dairy products, eggs and fish. According to the IOM, these proteins are a source of the nine essential amino acids (phenylalanine, histidine, isoleucine, leucine, lysine, methionine, threonine, tryptophan, and valine) and for this reason they are called AVB or "complete proteins. Plant proteins such as those found in legumes, grains, nuts, seeds, and some legumes do not contain all the essential amino acids, so they are called "incomplete proteins" (IOM, 2005).

The so-called simple or complex carbohydrates, such nomenclature was related to the speed of digestion and availability of serum glucose. The simple carbohydrates are quickly digested and increase blood glucose levels, and the complex carbohydrates are more slowly digested

and gradually increase blood glucose levels. Currently, it is known that the structure of the molecule influences the digestion time and the elevation of blood glucose (SHENK, S. et al, 2003).

However, postprandial blood glucose is influenced by the time of carbohydrate metabolization, the availability of serum glucose, insulin secretion and its peripheral tissue sensitivity. So, the glycemic response depends on the amount and glycemic index of the ingested carbohydrate (PUJOL, 2017).

The intrinsic factors that influence the glycemic response of carbohydrates can be their physical form (juice or fruit), the type of starch, the ripeness, the type of preparation (fried, boiled, baked), among others (FANI, 2016).

There are other factors that contribute to the glycemic response and that prevent the accuracy of this calculation such as age, body composition, meal timing, chewing, the existence of peripheral insulin resistance, gut microbiota, and genetic individuality, among others (DODD, 2011; QIN, 2012).

In any case, two mechanisms can impact to reduce the glycemic response at meals such as modulating the speed of carbohydrate absorption by including more viscous fiber and mono- or polyunsaturated fats, and increasing insulin secretion through protein consumption (AUGUSTIN, 2016).

The concentration and distribution of carbohydrates throughout the day can contribute to better glycemic control. However, this strategy must be individualized, taking into consideration the pregnant woman's eating habits, tests, and tolerance. Thus, to control the glycemic load of the diet, it is recommended to fraction and reduce the volume of carbohydrates, keeping fixed meal times (ADA, 2004; ADA, 2008).

The fractioning of meals allows the pregnant woman to avoid hypoglycemia, nausea and even emesis, besides regulating the hunger-satiation axis. Establishing times for meals allows the body to organize itself to supply digestive enzymes and hormones, optimizing the digestive process and avoiding discomforts (VITOLO, 2008).

Due to the increase in free fatty acids during pregnancy, an intake of up to 30% of total fats should be considered, limiting the intake of saturated fats to 10% and discouraging the intake of *trans fats*. In dyslipidemia, we recommend limiting cholesterol intake to 200 mg/day.

However, fat restriction is not recommended due to the fetal myelinization process, which may compromise neurological development (GUIMARÃES; SILVA, 2003).

In this regard, long-chain n-3 (omega-3) polyunsaturated fatty acids (LCPUFA), are essential in mammalian health. These fats are present in fish oil and flaxseed oil, with fish oil having the most efficient form of LCPUFA (BORDELEAU et al, 2020).

LCPUFA mediate physiological processes such as angiogenesis, immunity, inflammatory response, among other cellular and molecular functions that impact health and disease. Eicosapentaenoic acid, 22: 5n-3 (EPA) and Docosahexaenoic acid, 22: 6n-3 (DHA) comprise part of cell signaling. DHA is part of the structure and function of the cell membrane (BOURRE, 2006; BRADBURY, 2011).

Researchers report that a diet high in refined foods is low in n-3 PUFAs, leading individuals to an increased risk of disease (BASAK; MALLICK; DUTTAROY, 2021).

Thus, inadequate maternal intake of DHA and EPA can impair infant growth, exposing them to risks of cognitive decline, inflammatory processes, cardiovascular disease, behavioral changes, and mental stress in adulthood (KABARAN S; BESLER, 2015).

The study by HELLAND et al (2003) suggested that maternal supplementation of omega-3 polyunsaturated fatty acids such as DHA and AA during pregnancy and lactation influenced the intelligence of children. Although there are positive results of omega-3 supplementation during pregnancy, we must remember that adequate and individualized nutrition is essential during this period, directly influencing the effects of supplementation.

An observational study (N = 11,875) by Hibbeln et al (2007) showed that higher maternal consumption of seafood during the gestational period had an influence on fine motor skills, behavior, verbal intelligence, and social development in children up to 8 years of age.

The importance of consuming omega-3 fatty acids during pregnancy - for the health of both mother and baby - is now clear. A number of well-designed studies have proven these benefits.

Thus, a study conducted by BISGAARD et al (2016) with 736 pregnant women, linked omega-3 supplementation to reduced risk of allergies, asthma, and respiratory tract infections in infants. The researchers administered 2.4g of omega-3 (55% EPA and 37% DHA) per day, starting in the third trimester of gestation, suspending its administration in the last gestational week.

These results reinforce the importance of the quality of fats that will be part of the diet of pregnant women. Besides this important factor, it is necessary to take into consideration the other nutrients that will be part of the diet of pregnant women, since the synergy and

nutritional balance are more relevant than an isolated nutrient.

Therefore, the data cited here reinforce the importance of the quality of fats in the diet during pregnancy. In addition, one should take into consideration the other nutrients that will be part of the diet of pregnant women, in order to provide synergy and nutritional balance.

The food sources of LCPUFA (n-3) are cold and deep water fish, seafood, and seeds. Some fish have higher amounts of omega-3 (n-3) per serving, so in 60g of these we have, approximately, anchovies with 1,200mg, wild salmon with 590mg, sardines with 556mg, trout with 550mg, and tuna with 488mg. Similarly, of the seafood, mussels have 443mg, oysters 390mg, crab 234mg, scallops 206mg, and shrimp 178mg (MOZAFFARIAN; RIMM, 2006).

CONCLUSION

The alert remains, especially for pregnant women, because methyl mercury crosses the placenta, exposing the fetus to the risk of neurodevelopmental changes. It is worth pointing out that fish and seafood suffer from methyl mercury contamination related to environmental contamination, the predatory nature, and the longevity of the species. For example, swordfish, shark are larger animals that live longer, have higher concentrations of mercury, while smaller animals such as mollusks and salmon have lower concentrations of this metal (CTEM, 2000; DHHS-US, 2021).

The fish consumption recommendation for pregnant or lactating women according to the Dietary Guidelines for Americans (2015-2020) is 2 to 3 servings per week, choosing fish with low mercury content. Other guidance is to prefer fresh fish to canned, avoid fried foods, and prefer healthier preparations such as grilled or stewed (DHHS-US, 2015; BRAZIL, 2014).

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