Dietary n-6:n-3 PUFA Ratio Higher Than 9 Linked to Higher Risk of Postpartum Depression

The World Health Organization estimates that perinatal depressive disorders affect between 10% and 40% of women worldwide. In low- and middle-income countries, the average prevalence of common perinatal mental disorders was estimated at 15.9%. Rates in developed countries tend to be lower, ranging from 6.5% to 12.9% for major depression at different times during the first year postpartum. In Brazil, where this study was conducted, the prevalence of depression during pregnancy was reported at 24.3%. After delivery, postpartum depression prevalence fell to 10.8%.

Many factors contribute to the risk of perinatal depression: lower socioeconomic status, absence of a partner, being non-white, multiparity, psychological and physical violence and use of alcohol during pregnancy. Previous history of depressive symptoms, lack of support after pregnancy and maternal stress during pregnancy were associated with postpartum depressive symptoms in Canadian women. Nutrients that may contribute to risk include folate, vitamin B12, calcium, iron, selenium, zinc and omega-3 polyunsaturated fatty acids (n-3 PUFAs). Thus, risk of perinatal depressive symptoms is affected by complex biological, social and
psychological factors.

Children of depressed mothers are also affected. As infants, their interactions with their mothers are impaired and more likely to be hostile and negative. They face greater risks of psychological disorders, developmental problems and delayed or adverse emotional and cognitive development. Reducing the risk of perinatal depressive symptoms is likely to have far-reaching and positive consequences for families. Addressing nutrition shortfalls may be one of the most straightforward and effective approaches.

Camilla da Rocha and colleagues at the Federal University of Rio de Janeiro, Brazil, recruited 255 women receiving prenatal care at the public health center in Rio de Janeiro, of which 106 (46.1%) completed the follow-up evaluation of postpartum depression. Participants were 18- to 40-year-old women between 8 and 13 weeks’ gestation, with singleton pregnancies and absence of chronic diseases such as hypertension or diabetes. Dietary intakes were assessed using a validated food frequency questionnaire administered at enrolment and during the second and third trimesters. Socioeconomic, medical, anthropometric and lifestyle information was gathered by personal interview at baseline and weeks 19-21, 26-28, 36-40 and 30 days postpartum.

Participants who completed the follow-up conducted a self-administered assessment using the Edinburgh Postnatal Depression Scale at least 30 days postpartum. Scores ≥ 11 were used to assess the prevalence of moderate and severe depressive symptoms, as validated previously in the Brazilian population. Data analyses included many confounding variables, such as time elapsed between delivery and assessment of depressive symptoms, socio-economic and socio-demographic factors, lifestyle characteristics, obstetric
assessments, infant outcomes, pre-gestational nutritional status as reflected in body mass index and dietary intakes including total energy, lipids and fatty acids. Age, schooling, time elapsed since delivery and lipid consumption were included in the statistical model.

The prevalence of postpartum depressive symptoms in mothers at least 30 days postpartum was 26.4% (95% CI = 18.0 – 34.8). Mothers who developed postpartum depressive symptoms were more likely to be underweight according to their body mass index prior to becoming pregnant, have 9 years or less schooling and were more likely to have a dietary n-6 PUFA:n-3 PUFA ratio higher than 9:1 (Table). The investigators calculated their dietary n-6:n-3 ratios using data for linoleic and alpha-linolenic acids, using as a reference the Institute of Medicine’s recommendations for adequate intakes of these fatty acids of 13 and 1.4 g/day, respectively. Most of the n-3 PUFA consumption came from alpha-linolenic acid. In multivariate analysis, the n-6 PUFA:n-3 PUFA ratio and pre-pregnancy body mass index below 18.5 kg/m^2 were significantly associated with a higher risk of postpartum depressive symptoms.

The key observation in this study was the 2.5-fold greater risk of postpartum depressive symptoms in women whose dietary PUFA ratio (linoleic:alpha-linolenic acids) in the first trimester of pregnancy was greater than 9:1. Although the study did not report the consumption of fish or DHA, or blood values for long-chain n-3 PUFAs, it may be that high intakes of linoleic acid along with low consumption of DHA may reduce the concentration of DHA in the red blood cells of these pregnant women, as suggested in a report of Canadian pregnant
women. As reported recently, the ratio of linoleic:alpha-linolenic acids in US diets increased 38% from 1909 to 1999, increasing from 7.3 to 10. If the associations reported here were applied to US women, the increased proportion of PUFAs from linoleic acid and the reduced intake of alpha-linolenic acid would contribute to a greater risk of postpartum depressive symptoms.

Low concentrations of DHA in plasma or red blood cell phospholipids, which are not increased by higher alpha-linolenic acid consumption, have been associated with a higher risk of postpartum depressive symptoms. Similarly, low fish intakes, which are the main source of DHA, have been associated with high levels of depressive symptoms in pregnant women.

One disadvantage to fatty acid data expressed as ratios is that they do not indicate whether the numerator or denominator is the most important factor in any associated response. One can speculate that both high linoleic acid and low DHA intakes contributed to the observed relationship, but the explanation remains conjectural. The small number of cases also limits the analysis and interpretation. The study highlights the importance of pre-pregnancy nutritional status as reflected in the body mass index as a potential contributor to the mother’s health and mental well-being, though the number of participants in the lowest category was small. Under nutrition may be a more urgent concern among low socioeconomic women, but diet quality remains an important characteristic of healthy mothers and their offspring. These findings also support previous reports of the association between the adequacy of omega-3 fatty acid intakes, especially the long-chain forms and the risk of postpartum
depressive symptoms.