

Antidepressant-like effects of omega-3 fatty acids in postpartum model of depression in rats

ABSTRACT

Postpartum depression (PPD) is a psychiatric disorder that occurs in 10–15% of childbearing women. It is hypothesized that omega-3 fatty acids, which are components of fish oil, may attenuate depression symptoms. In order to examine this hypothesis, the animal model of postpartum depression was established in the present study. Ovariectomized female rats underwent hormone-simulated pregnancy (HSP) regimen and received progesterone and estradiol benzoate or vehicle for 23 days, mimicking the actual rat's pregnancy. The days after hormone termination were considered as the postpartum period. Forced feeding of menhaden fish oil, as a source of omega-3, with three doses of 1, 3, and 9 g/kg/d, fluoxetine 15 mg/kg/d, and distilled water 2 ml/d per rat started in five postpartum-induced and one vehicle group on postpartum day 1 and continued for 15 consecutive days. On postpartum day 15, all groups were tested in the forced swimming test (FST) and open field test (OFT), followed by a biochemical assay. Results showed that the postpartum-induced rats not treated with menhaden fish oil, exhibited an increase in immobility time seen in FST, hippocampal concentration of corticosterone and plasmatic level of corticosterone, and pro-inflammatory cytokines. These depression-related effects were attenuated by supplementation of menhaden fish oil with doses of 3 and 9 g/kg. Moreover, results of rats supplemented with menhaden fish oil were comparable to rats treated with the clinically effective antidepressant, fluoxetine. Taken together, these results suggest that menhaden fish oil, rich in omega-3, exerts beneficial effect on postpartum depression and decreases the biomarkers related to depression such as corticosterone and pro-inflammatory cytokines.

Keyword: Postpartum depression; Omega-3 fatty acid; Hormone simulated pregnancy; Forced swimming test; Pro-inflammatory cytokine; Corticosterone