

The Antioxidant Effect of Omega-3 Fatty Acid Supplements on Oxidative Stress Markers in Children with Autism Spectrum Disorder: A Case-Control Study

Haidar A Abdulamir, PhD* Enas Muhsin Abbass ALKHAFAGY, PhD** Safa K. Qasim, MSc*** Ameer AA Aldafaay, MSc****
Balqes Hisham Al Janabi, MSc***** Qusay Jassam Shandookh, PhD***** Ahmed Hamza Al-Shammari, PhD*****

ABSTRACT

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition characterized by deficits in social communication and repetitive behaviors. Emerging evidence suggests that oxidative stress plays a significant role in its pathophysiology. Omega-3 polyunsaturated fatty acids (PUFAs) possess potent antioxidant properties that may mitigate oxidative damage in autistic children. The present study aimed to assess the antioxidant effect of omega-3 fatty acid supplementation on oxidative stress markers, Malondialdehyde (MDA), Superoxide Dismutase (SOD), and Catalase (CAT) in children with ASD in a comparison with to healthy controls in a case-control study that conducted on 90 subjects divided into three groups (30 subjects each): Group I includes healthy control children; Group II includes autistic children receiving omega-3 supplementation; and Group III who are autistic children that didn't receive omega-3 supplementation. Serum levels of MDA, SOD, and CAT were measured in patients' groups and compared with those of controls and the results demonstrated that children in Group III demonstrated significantly elevated MDA levels and reduced SOD and CAT activities compared to both healthy controls and omega-3-treated autistic children ($p < 0.05$). Omega-3 supplementation (Group II) significantly reduced MDA levels and restored SOD and CAT activities toward values comparable to healthy controls. In conclusion, Omega-3 fatty acid supplementation exerts a significant antioxidant effect in children with ASD, reducing oxidative stress markers. These findings support the therapeutic potential of omega-3 in managing ASD-related oxidative stress.

Keywords: Antioxidants, Autism Spectrum Disorder, Catalase (CAT), Malondialdehyde (MDA), Omega-3 fatty acids, Oxidative stress, Superoxide Dismutase (SOD).

Bahrain Med Bull 2026; 48 (3): 3554 - 3558

* College of Pharmacy, University of Hilla, Babylon 51001, Iraq.
Email: haider.adnan@hilla-unc.edu.iq

** Chemistry and Biochemistry Department
College of medicine, Al-Mustansiriyah University, Baghdad, Iraq

*** Department of Clinical Laboratory Science
College of Pharmacy, University of Basrah, Basrah, Iraq.

**** Department of Clinical Laboratory Sciences
Faculty of Pharmacy, Al-Turath University, Baghdad, Iraq.

***** Department of Clinical Pharmacy
College of Pharmacy, Al-Esraa University, Baghdad, Iraq.

***** Department of Pharmacy, Al-Yarmouk University College
Baqubah/Diyala, Iraq.

***** Department of Anesthesia Techniques
College of Health and Medical Techniques
University of Kut, Wasit, Kut, 52001 Iraq.