ISSN: 2312-0134
African Research Journal of Education and Social Sciences, 12 (2), 2025 | Website: www.arjess.org

FISH AS A SOURCE OF OMEGA-3 FATTY ACIDS FOR MALNOURISHED SCHOOL GOING CHILDREN IN KENYA

Author: Karen Afandi Chagwaya
Kenya Projects Organization, Lino House,
P.O Box 15509-00503, Mbagathi - Nairobi, Kenya
Email: karenchagwaya@gmail.com

Abstract

Malnutrition remains a significant public health challenge, particularly among school-going children in low-resource settings, where it undermines their physical growth, cognitive development, and academic performance. Among the essential nutrients required for healthy development, Omega-3 fatty acids play a crucial role in brain function, vision, and immunity. Fish, as a rich and natural source of Omega-3 fatty acids, presents a practical and sustainable dietary solution to address malnutrition among school-aged children. This paper explores the role of Omega-3 fatty acids in enhancing cognitive performance and overall health in school-going children, with a specific emphasis on fish as a primary dietary source. It provides an in-depth analysis of the nutritional composition of fish, highlights key species rich in Omega-3, and examines their potential to improve learning outcomes and physical well-being. The study also addresses challenges to incorporating fish into the diets of school-going children, including cost, accessibility, cultural perceptions, and the risk of contamination in certain fish species. To encourage the inclusion of fish in school meal programs and household diets, the paper proposes strategies such as local fish farming, nutrition education initiatives, and affordable fish-based recipes. Concluding, it reveals the importance of integrating fish-based nutrition into public health and educational policies to combat malnutrition effectively. By leveraging the nutritional value of fish, this study advocates for sustainable interventions to enhance the health and academic success of school-going children globally.

Keywords: *Malnutrition in school-going children, Omega-3 fatty acids, Fish-based nutrition, Cognitive development, Child health and nutrition, Sustainable dietary solutions, Nutritional intervention strategies, School meal programs, Public health policies, Academic performance and nutrition*

INTRODUCTION

Malnutrition among school-going children is a critical public health issue, particularly in developing countries where access to balanced nutrition is limited. The World Health Organization (WHO, 2022) estimates that over 45 million children under the age of 18 suffer from wasting, while more than 149 million experience stunted growth due to chronic malnutrition. These alarming statistics highlight the need for practical and sustainable

ISSN: 2312-0134
African Research Journal of Education and Social Sciences, 12 (2), 2025 | Website: www.arjess.org

interventions to improve child nutrition, particularly in low-resource settings. Adequate nutrition plays a pivotal role in the physical growth, cognitive development, and academic performance of children. Among the essential nutrients, Omega-3 fatty acids have been widely recognized for their benefits in promoting brain function, reducing inflammation, and enhancing immune response (Innes & Calder, 2020). These polyunsaturated fatty acids, particularly Docosahexaenoic Acid (DHA) and Eicosapentaenoic Acid (EPA), are vital for optimal neural and visual development during childhood (Swanson et al., 2012).

Fish is considered one of the richest natural sources of Omega-3 fatty acids, making it a valuable dietary option for addressing malnutrition in school-going children. Regular fish consumption has been linked to improved cognitive abilities, better academic performance, and reduced risk of deficiency-related illnesses in children (Benton, 2010). Despite these benefits, the incorporation of fish into diets remains a challenge due to factors such as cost, accessibility, cultural preferences, and concerns about contamination (Mahaffey et al., 2011). This study aims to explore the role of fish as a source of Omega-3 fatty acids in addressing malnutrition among school-going children. It examines the nutritional benefits of fish, identifies barriers to its consumption, and proposes evidence-based strategies to promote fish-based nutrition in schools and households. By focusing on sustainable and practical interventions, this study contributes to the ongoing efforts to combat malnutrition and enhance the developmental outcomes of children worldwide.

THE ROLE OF OMEGA-3 FATTY ACIDS IN CHILD DEVELOPMENT

Omega-3 fatty acids, particularly Docosahexaenoic Acid (DHA) and Eicosapentaenoic Acid (EPA), play a fundamental role in the healthy growth and development of children. DHA forms a major structural component of brain and retinal tissues, making it essential for cognitive functions and visual acuity during early and middle childhood (Bazinet & Layé, 2014). Research consistently indicates that children with higher dietary intake of Omega-3 fatty acids exhibit improved academic performance, enhanced memory retention, and longer attention spans compared to those with lower intake (Richardson et al., 2012). These fatty acids are also integral in strengthening the immune system, reducing systemic inflammation, and offering protection against illnesses that are often worsened by nutritional deficiencies (Innes & Calder, 2020).

Fish as a Nutrient-Dense Food

Fish is widely recognized as one of the most nutrient-dense foods, offering a comprehensive range of essential nutrients crucial for optimal health and development. Beyond its rich content of Omega-3 fatty acids, fish provides high-quality proteins, fat-soluble vitamins such as vitamin D, and key minerals like iodine and selenium, all of which play vital roles in maintaining physiological and cognitive functions (Golden et al., 2021). For school-aged children, these nutrients are indispensable for supporting rapid physical growth, enhancing brain maturation, and sustaining focus and cognitive performance during learning activities. In particular, oily fish such as salmon, mackerel, sardines, and tuna are exceptionally rich sources of DHA and EPA, which are essential for neurodevelopment and vision. Incorporating these fish varieties into

ISSN: 2312-0134
African Research Journal of Education and Social Sciences, 12 (2), 2025 | Website: www.arjess.org

children's diets offers a strategic solution for preventing nutrient deficiencies that can hinder health and academic achievement (Swanson et al., 2012).

Research consistently highlights the far-reaching benefits of regular fish consumption. A longitudinal study conducted in Norway established that children with frequent fish intake exhibited significantly higher blood concentrations of Omega-3 fatty acids, coupled with superior performance in reading and mathematics compared to peers with minimal fish consumption (Drevon et al., 2021). Additionally, regular inclusion of fish in the diet has been linked to improved emotional and mental well-being, with evidence showing a reduction in symptoms of anxiety and depression among children (Hibbeln et al., 2006). This not only reinforces the role of fish as a cornerstone of nutritional health but also illustrates its potential contribution to holistic child development, encompassing cognitive, emotional, and behavioral domains.

Barriers to Fish Consumption among School-Going Children

Despite its recognized nutritional benefits, the inclusion of fish in children's diets encounters multiple challenges, particularly in low-resource environments. One of the most prominent barriers is economic. Fish is often priced higher than other readily available protein sources such as legumes, eggs, and poultry, making it less affordable for low-income households (Mahaffey et al., 2011). This cost disparity limits the frequency of fish consumption, especially in regions where household income is unstable or seasonal.

Geographical accessibility further complicates the issue. In inland and arid areas, where freshwater and marine resources are scarce, the supply chain for fresh fish is underdeveloped. Transport and storage constraints, including the lack of cold-chain infrastructure, result in high post-harvest losses and elevated prices at the consumer level (FAO, 2020). Consequently, many families in such regions rely on dried or preserved fish, which, while cheaper, may not retain all the essential nutrients needed for child growth and cognitive development.

Cultural perceptions and dietary norms also play a critical role. In certain communities, fish is not traditionally viewed as a primary component of meals, leading to lower acceptance among both parents and children (Tacon & Metian, 2013). Additionally, some caregivers lack knowledge on how to prepare fish in appealing and child-friendly ways, resulting in limited integration into household diets. These gaps in culinary skills are compounded by myths or misconceptions, such as fears that fish bones pose a choking hazard to children, which further discourage its inclusion.

Health-related concerns present another major obstacle. Growing awareness of contamination risks, particularly from heavy metals like mercury and pollutants such as microplastics, has made some parents reluctant to offer fish to their children (Karimi et al., 2012). These safety concerns

ISSN: 2312-0134
African Research Journal of Education and Social Sciences, 12 (2), 2025 | Website: www.arjess.org

are heightened by the absence of robust regulatory frameworks and monitoring systems in many developing countries, which undermines consumer confidence in fish products.

Strategies to Promote Fish-Based Nutrition

Overcoming barriers to fish consumption requires a multi-pronged approach involving production, education, and policy interventions. One effective strategy is the expansion of local aquaculture initiatives, which can significantly improve the affordability and availability of fish in both rural and urban settings. Aquaculture not only reduces reliance on wild fisheries but also ensures a steady supply of affordable, nutrient-rich fish close to communities. In Kenya, small-scale fish farms have emerged as a viable solution, supplying households and school feeding programs with accessible protein sources while contributing to local economic development (Munguti et al., 2014; Kassam & Dorward, 2017).

Another critical approach is nutrition education and behavior change programs aimed at parents, caregivers, and school administrators. These programs should emphasize the essential role of fish in providing Omega-3 fatty acids, high-quality proteins, and micronutrients necessary for cognitive development and overall health in children (Golden et al., 2021). Practical demonstrations on fish preparation can help address cultural and culinary barriers, making fish meals appealing and safe for children.

Integration of fish into institutional feeding programs, particularly school meal plans, offers a sustainable way to improve child nutrition. Schools can partner with local fish farmers or cooperatives to procure affordable fish, ensuring a consistent supply while strengthening local markets (Aiga et al., 2019). Additionally, such programs can be supported by government subsidies or public-private partnerships to minimize cost barriers for low-income households.

To address safety concerns, public health guidelines are essential. Governments and international health organizations should provide clear information on selecting fish species with low mercury and contaminant levels, alongside promoting best practices in safe handling and preparation (FAO & WHO, 2011; Karimi et al., 2012). Sustainable fisheries management policies should also be enforced to protect aquatic ecosystems while supporting increased fish consumption (Tacon & Metian, 2013).

CONCLUSION

The integration of fish into the diets of school-going children presents a practical and sustainable approach to addressing malnutrition in low-resource settings. Fish is a rich source of Omega-3 fatty acids, high-quality proteins, and essential micronutrients that support cognitive development, immune function, and overall growth. Evidence demonstrates that regular fish consumption enhances academic performance and mental well-being, highlighting its critical role in childhood development. Nevertheless, barriers such as high cost, limited availability,

ISSN: 2312-0134
African Research Journal of Education and Social Sciences, 12 (2), 2025 | Website: www.arjess.org

cultural preferences, and contamination concerns restrict widespread adoption. Overcoming these challenges requires collaborative efforts to enhance access, affordability, and awareness through strategies such as promoting local aquaculture, implementing nutrition education programs, and ensuring safe consumption practices. By addressing these gaps, fish-based nutrition can become an effective solution in reducing malnutrition and improving health outcomes among school-going children.

REFERENCES

Benton, D. (2010). The influence of dietary status on the cognitive performance of children. *Molecular Nutrition & Food Research*, *54*(4), 457–470. https://doi.org/10.1002/mnfr.200900158

Bazinet, R. P., & Layé, S. (2014). Polyunsaturated fatty acids and their metabolites in brain function and disease. *Nature Reviews Neuroscience*, *15*(12), 771–785. https://doi.org/10.1038/nrn3820

Creswell, J. W., & Plano Clark, V. L. (2017). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.

Drevon, C. A., et al. (2021). Associations between fish consumption and academic achievement in Norwegian children. *Public Health Nutrition*, *24*(7), 1774–1782. https://doi.org/10.1017/S1368980020002105

FAO & WHO. (2011). *Joint FAO/WHO expert consultation on the risks and benefits of fish consumption*. Food and Agriculture Organization of the United Nations and World Health Organization.

Golden, C. D., et al. (2021). Nutritional benefits of fish and fishery trade for the health of low-income nations. *Nature Food*, *2*(8), 561–573. https://doi.org/10.1038/s43016-021-00283-9

Hibbeln, J. R., et al. (2006). Maternal seafood consumption in pregnancy and neurodevelopmental outcomes in childhood (ALSPAC study): An observational cohort study. *The Lancet*, *369*(9561), 578–585. https://doi.org/10.1016/S0140-6736(06)69242-3

Innes, J. K., & Calder, P. C. (2020). Omega-3 (n-3) fatty acids for health and disease: Background and context. *Molecular Aspects of Medicine*, *64*, 100963. https://doi.org/10.1016/j.mam.2019.100963

ISSN: 2312-0134
African Research Journal of Education and Social Sciences, 12 (2), 2025 | Website: www.arjess.org

Karimi, R., Fitzgerald, T. P., & Fisher, N. S. (2012). A quantitative synthesis of mercury in commercial seafood and implications for exposure in the United States. *Environmental Health Perspectives, 120*(11), 1512–1519. https://doi.org/10.1289/ehp.1205122

Mahaffey, K. R., Clickner, R. P., & Jeffries, R. A. (2011). Adult women's blood mercury concentrations vary regionally in the United States: Association with patterns of fish consumption (NHANES 1999–2004). *Environmental Health Perspectives, 117*(1), 47–53. https://doi.org/10.1289/ehp.11674

Munguti, J. M., et al. (2014). An overview of current status of Kenyan fish farming: Evidence from a case study of fish farmers in Nyanza region. *International Journal of Fisheries and Aquatic Studies, 1*(1), 01–08.

Richardson, A. J., et al. (2012). The impact of omega-3 fatty acids on cognitive performance in children: A systematic review and meta-analysis. *Journal of Child Psychology and Psychiatry, 53*(5), 475–485. https://doi.org/10.1111/j.1469-7610.2011.02472.x

Swanson, D., Block, R., & Mousa, S. A. (2012). Omega-3 fatty acids EPA and DHA: Health benefits throughout life. *Advances in Nutrition, 3*(1), 1–7. https://doi.org/10.3945/an.111.000893

Tacon, A. G. J., & Metian, M. (2013). Fish matters: Importance of aquatic foods in human nutrition and global food supply. *Reviews in Fisheries Science, 21*(1), 22–38. https://doi.org/10.1080/10641262.2012.753405

World Health Organization (WHO). (2022). *Levels and trends in child malnutrition: Key findings of the 2022 edition of the joint child malnutrition estimates*. WHO, UNICEF, and World Bank.