



# EFFECT OF OMEGA THREE 3 ON SOCIAL IMPROVEMENT AND ACADEMIC ACHIEVEMENT OF JUNIOR SECONDARY SCHOOL (JSS III) STUDENTS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER IN JIGAWA STATE

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**Abstract:** This study investigated the impact of Omega-3 supplementation on social and academic outcomes in JSS III students with ADHD in Jigawa State. The cohort comprised predominantly male students (60%) with an average age of 14, attending mostly urban schools (70%). Results indicated a significant increase in social skills ratings from 2.5 to 4 out of 5, with 60% of students experiencing enhanced social interactions and 70% reporting increased confidence. Statistical analyses, including a T-Test (T-Value: 4.57,  $p < 0.001$ ) and Chi-Square test ( $\chi^2$ : 13.84,  $p = 0.0002$ ), confirmed these improvements. Academic performance ratings also improved from 2 to 3.5 out of 5, with 65% of students showing better concentration and 60% completing assignments on time. An ANOVA revealed significant differences across schools (F-Value: 3.47,  $p = 0.001$ ), suggesting environmental factors influence Omega-3's effectiveness. A MANOVA demonstrated significant multivariate effects (Pillai's Trace: 0.58,  $p = 0.007$ ), and a correlation analysis indicated a strong positive relationship ( $r = 0.67$ ,  $p < 0.001$ ) between Omega-3 supplementation duration and social skill enhancements. Factor analysis revealed two main contributors to variance: Social Improvement (45%) and Academic Achievement (35%). These findings support Omega-3's role in improving ADHD management, with implications for reduced stimulant medication dosages and enhanced adolescent development.

**Keywords:** *Omega-3 Supplementation; ADHD; Junior Secondary School; Social Skills Improvement; Academic Performance*

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## 1.0 Introduction

### A. Background Information

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by symptoms of inattention, hyperactivity, and impulsivity (American Psychiatric Association, 2013; R. A., 2015;) It is one of the most common childhood disorders and can continue through adolescence and adulthood (Re., & Capodici, 2020 The prevalence of ADHD varies globally, and while specific data for Jigawa State is not readily available, it is recognized that ADHD affects learning and academic performance significantly. Children with ADHD often experience difficulties in maintaining concentration, organizing tasks, and following instructions, which can impact their academic achievement (Polanczyk, de Lima, Horta, Biederman., & Rohde, 2007; DuPaul., & Stoner, 2003)

### B. Statement of the Problem

Junior Secondary School (JSS III) students with ADHD in Jigawa State face numerous challenges. These include behavioral issues, such as impulsivity and inattention, which can lead to poor academic performance and social interactions. The traditional educational environment often does not cater to the unique needs of these students, potentially leading to a cycle of academic underachievement and social isolation (Polanczyk, de Lima, Horta, Biederman., & Rohde, 2007; DuPaul., & Stoner, 2003)

### C. Purpose of the Study

This study aims to investigate the potential benefits of Omega-3 fatty acid supplementation on the social improvement and academic achievement of JSS III students with ADHD in Jigawa State. Omega-3 fatty acids, particularly eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), are essential for brain function and have been shown to have a positive impact on various mental health conditions, including ADHD (Mischoulon, 2020; Rd, 2023; Rees, 2023)

### D. Research Questions/Hypotheses

#### i. Questions

The following research questions and hypotheses guided this study:

- Does Omega-3 supplementation improve the academic performance of JSS III students with ADHD?
- Can Omega-3 fatty acids lead to better social interactions and peer relationships among these students?
- Is there a significant difference in the attention span and behavior of students with ADHD before and after Omega-3 supplementation?

#### ii. Hypotheses

- Omega-3 supplementation will result in improved academic performance in JSS III students with ADHD.
- Students with ADHD who receive Omega-3 supplements will exhibit enhanced social skills and peer interactions.
- There will be a noticeable improvement in the attention span and behavior of students with ADHD post Omega-3 supplementation.

## 2.0. Literature Review

### 2.1. Define ADHD and its Symptoms

**Definition** Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development.

**Symptoms:** ADHD symptoms are divided into two categories: inattention and hyperactivity-impulsivity. Inattention symptoms include difficulty sustaining attention, failure to follow through on tasks, and disorganization. Hyperactivity-impulsivity symptoms include excessive talking, fidgeting, and an inability to wait one's turn. The symptoms must be present for at least six months, be inappropriate for the developmental level, and cause impairment in social, academic, or occupational settings (Pagán, A.F., Huizar, Y.P., Short, T.R. et al. 2023)

#### 2.1.1. Biological Mechanisms

ADHD is associated with disruptions in various neuronal structures and pathways, dopamine transporter, and receptor genes, leading to cognitive and regulation deficits. White matter disruptions in multiple cortical pathways have been identified in adults with ADHD (Jadidian, Hurley., & Taber, 2015)

#### 2.1.2. Treatments

Treatment options for ADHD include medications, psychotherapy, education or training, or a combination of treatments. Medications can be stimulants or non-stimulants, and psychotherapy often includes behavioral therapy (Re., & Capodiec, 2020; Caye, Swanson, Coghill., & Rohde, 2019; Goode, Coeytaux, Maslow, Davis, Hill, Namdari., & Allen, 2018; Childress., & Berry, 2023)

#### 2.1.3. Outcomes

ADHD is a lifelong condition that can significantly impact social, occupational, and educational functioning. It is highly heritable, and while it is associated with an average reduction in life expectancy, early diagnosis and treatment can improve outcomes (Ebeling, Meyer., & Modig, 2020)

#### 2.1.4. Controversies and Current Research

There are ongoing debates regarding the effectiveness of current assessments and treatments for ADHD. New research is exploring biological markers and new treatments, such as viloxazine ER and transcranial direct current stimulation, for adults with ADHD (Mehta, Mannem., & Yarasi. et al. 2020)

## 2.2. Omega-3's Effects on ADHD

### 2.2.1. Potential Benefits

#### ➤ Improved Attention

A study published in 2015 found that Omega-3 supplementation led to improved attention in boys with ADHD. This study suggests that Omega-3 fatty acids may be beneficial for reducing symptoms of inattention in individuals with ADHD (Bos, Oranje, Veerhoek, Van Diepen, Weusten, Demmelmair., & Durston, 2015)

### ➤ **Neurological Development**

Omega-3 fatty acids are essential for brain health, playing a crucial role in the development of cell membranes and myelin. Myelin is the protective sheath around neurons that facilitates the transmission of electrical signals. Adequate levels of Omega-3s may support the integrity of these structures and thus potentially improve neurological functions related to ADHD (Greenblatt., & Gottlieb, 2023; Siiankovskaia, 2023; Rangel-Huerta., & Gil, 2018; Richardson, 2006)

#### **2.2.2. Conflicting Evidence:**

**Inconclusive Results:** A review from 2019 reported that there is limited evidence to support the claim that Omega-3 supplementation can significantly improve ADHD symptoms in children and adolescents (Rees, 2023)

Research from The University of Manchester, which examined the effectiveness of Omega-3 supplementation in reducing ADHD symptoms in children as measured by the Conners' rating scales, also concluded that there is little supportive evidence to validate the claim of Omega-3 supplementation to reduce the degree of ADHD symptoms experienced by children and adolescents (Abdullah, Jowett, Whittaker., & Patterson, 2019)

An article from **Psychology Today** discussing a study comparing the efficacy of Omega-3 fatty acids with Omega-6 fatty acid and finding no overall improvement in ADHD symptoms (Derbyshire, 2017)

#### **2.2.3. Minor Benefits**

Other reviews in 2021 indicated that while there may be some minor benefits of Omega-3 supplements for ADHD, the results across various studies have been inconsistent. The authors of this review call for more rigorous research to determine the efficacy of Omega-3s in treating ADHD symptoms. Those are:

A **Forbes Health** article discusses a comprehensive review from 2021 that found 33 studies associating omega-3 supplementation with small-to-medium improvements in ADHD symptoms, while 18 studies observed very small improvements (Silva, 2024)

**Medical News Today** also references a 2021 review suggesting that omega-3 supplements could have minor beneficial effects on ADHD. However, the authors of this review noted the conflicting results in the scientific literature and called for more research to confirm any potential benefits (Rees, 2023)

#### **2.2.4. Mechanism of Action:**

**Neurotransmission:** The mechanism by which Omega-3 fatty acids might alleviate ADHD symptoms is not entirely clear. However, it is known that deficiencies in Omega-3s are linked to smaller neuron size and altered behavior. There is also evidence to suggest that Omega-3 deficiencies can lead to reduced neurotransmission of dopamine and serotonin, which are neurotransmitters involved in mood regulation and cognitive function (Greenblatt., & Gottlieb, 2023; Singh, 2020; Rangel-Huerta., & Gil, 2018)

#### **2.2.5. Dosage and Administration:**

**Consultation with Healthcare Providers:** Due to the lack of a standardized dosage of fish oil or Omega-3 supplements for ADHD, it is crucial for individuals to consult with healthcare providers to determine the most appropriate dosage based on individual needs and current research (Newmark, 2023; Newmark, 2024; Medical News Today. 2023; The Conversation. 2019)

### **2.3.Social Improvement and Academic Achievement Metrics**

Identify how social improvement and academic achievement will be measured, is the in-thing of this research, however, for convenience the two (2) will be treated separately, viz:

#### **2.3.1. Social Improvement Metrics**

##### ➤ **Peer Interaction**

Observational assessments and peer nominations can be used to measure changes in social interactions and acceptance among classmates.

A study by Mikami, et. Al. (2017) reviews recent advances in social skills training (SST) for children and adolescents with ADHD, emphasizing the importance of in vivo reminders and feedback at the point of performance (Mikami, Smit., & Khalis, 2017)

##### ➤ **Social Skills**

A systematic review assesses the effectiveness of stand-alone SST for improving the social skills and functioning of youth with ADHD (Willis, Siceloff, Morse, Neger., & Flory, 2019)

##### ➤ **Behavioral Assessments**

A study by McQuade et al, (2018) examines whether children with ADHD have deficits in social skills acquisition or performance, finding that children with ADHD demonstrate significant social performance deficits (McQuade, Hoza, Murray-Close, Waschbusch., & Owens, 2018)



### 2.3.2. Academic Achievement Metrics:

#### ➤ Standardized Tests

Performance on standardized academic tests can be used to measure changes in academic skills, particularly in areas like reading and mathematics.

Omega-3 fatty acids have been studied for their potential impact on cognitive functions relevant to standardized tests. A review by Chang et al. suggests that Omega-3 supplementation can improve clinical symptoms and cognitive measures associated with attention in youths with ADHD (Chiu et al. 2008) This could potentially translate to better performance on standardized tests that measure academic skills.

#### ➤ Grade Point Average (GPA)

Tracking changes in GPA over time can indicate academic improvement.

The relationship between Omega-3 supplementation and GPA is less clear. While some studies suggest that Omega-3 can have a positive effect on cognitive functions, there is limited direct evidence linking Omega-3 intake to improvements in GPA. However, given that cognitive improvements can influence academic performance, it's plausible that Omega-3 could indirectly affect GPA over time. (Kelley-Hedgpepeth, 2021; In Depth, n.d.; Dempsey, Rockwell., & Wentz, 2023)

#### ➤ Classroom Performance

Teacher assessments and classroom observations can provide qualitative data on student engagement, participation, and performance.

Classroom performance can be enhanced by factors such as improved attention and behavior, which are areas where Omega-3 supplementation has shown some efficacy. A study by Carucci et al. did not find a significant improvement in inattentive symptoms with Omega-3/6 supplementation, suggesting a limited role of Omega-3/6 dietary products in children with mild ADHD-I<sup>2</sup>. However, other studies indicate that Omega-3 may improve clinical symptoms and cognitive performances in children and adolescents with ADHD, which could positively impact classroom performance (Carucci, et al. 2022) This study evaluated the efficacy of Omega-3/6 dietary supplements in children with mild ADHD-I and found no significant improvement in inattentive symptoms (Chang, Su, Mondelli., & Pariante, 2018) This meta-analysis found that Omega-3 supplementation monotherapy improves clinical symptoms and cognitive performances in children and adolescents with ADHD.

In summary, while there is evidence supporting the beneficial effects of Omega-3 on cognitive functions and clinical symptoms in youths with ADHD, more research is needed to establish a direct link to academic achievement metrics such as standardized test scores and GPA. Classroom performance may benefit from Omega-3 supplementation, but the results are mixed and warrant further investigation.

### 2.3.3. Measurement Considerations:

➤ **Baseline Assessments:** Establishing baseline measurements before Omega-3 supplementation begins is crucial for comparison. This is supported by a study published in JAMA, which detailed the importance of baseline plasma levels of EPA and DHA for assessing the impact of Omega-3 supplementation (Okereke et al. 2021)

➤ **Longitudinal Design:** A longitudinal study design can help in observing changes over time and attributing them to Omega-3 intervention. For instance, a systematic review and meta-analysis published in Nutrition Reviews highlighted the use of longitudinal studies to assess the impact of Omega-3 supplementation on sleep-related outcomes (Ying., & Jianghong, 2021)

➤ **Control Groups:** Including a control group of students with ADHD not receiving Omega-3 supplements can help in isolating the effects of the intervention. Research published in the Journal of Experimental Criminology utilized a randomized, stratified, double-blind, placebo-controlled, parallel-group trial to examine the effects of Omega-3 supplementation, demonstrating the importance of control groups in such studies (Raine et al. 2020)

### 2.4. Further Reviews

A systematic review by Arnold et al. highlighted that ADHD adversely affects long-term academic outcomes and that both achievement test outcomes and academic performance improve most consistently with multimodal treatment (Langberg., & Becker, 2015; Arnold, Hodgkins, Caci, Kahle., & Young, 2015; Shaw, M., Hodgkins, P., Caci, H. et al. 2012)

Research on the role of Omega-3 fatty acids in developmental psychiatric disorders, including ADHD, suggests that while there is evidence of some benefits, the results are not conclusive (Agostoni, Ciappolino, Tesei., & Brambilla, 2017; Langberg, Joshua & Becker, 2015; Arnold, Hodgkins, Caci, Kahle., & Young, 2015; Shaw et al. 2012). <https://doi.org/10.1186/1741-7015-10-99>; Richardson, 2006)

### 3.0. METHODOLOGY

#### A. Participants Selection: Criteria for selecting JSS 3 students with ADHD in Jigawa State included:

- A formal diagnosis of ADHD by a licensed psychologist or psychiatrist or physician
- Enrollment in a JSS III class within the state.
- Parental and school consent for participation in the study.
- No current Omega-3 supplementation.

#### B. Data Collection Methods: The study employed a mixed-methods approach:

- **Surveys:** Standardized questionnaires to assess academic performance and social skills before and after Omega-3 supplementation, was used.
- **Interviews:** Semi-structured interviews with teachers, parents, and students to gather qualitative data on behavioral changes.
- **Observations:** Classroom observations conducted by teachers who reported changes in student interactions and engagement.

#### C. Ethical Considerations:

- **Consent:** Informed consent was obtained from all participants' parents or guardians, and teachers explaining the purpose and benefits of the study.
- **Confidentiality:** Participants' identities were protected through the use of unique identifiers. All data was handled securely and only accessible to the research team.

#### D. Data Analysis

The following statistical methods used:

- T-Test for Social Skills Improvement
- Chi-Square Test for Association Between Omega-3 Supplementation and Social Functioning
- Correlation Analysis for Omega-3 Duration and Academic Performance
- ANOVA for Academic Performance Across Different Schools

### 4.0. RESULTS

The data and statistical test are given in alphabets, bullet-points, and Tabs 1,2,3, 4, &5 below.

#### A. Demographic Information

- **Age:** The average age of participants is 14 years old.
- **Gender:** 60% male, 40% female.
- **School Name:** Distribution across 10 different schools in Jigawa State.
- **School Location:** 70% urban, 30% rural.
- **Type of School:** 50% day, 50% boarding.
- **School Gender Type:** 40% boys, 30% girls, 30% mixed.

#### B. ADHD Diagnosis and Treatment

- **Diagnosed with ADHD:** 100% of participants.
- **Duration of Diagnosis:** Average of 3 years since diagnosis.
- **Received Treatment:** 80% have received some form of treatment.
- **Current Medication:** 50% are currently on medication.
- **Omega-3 Supplementation:** 40% have taken Omega-3 supplements before.
- **Duration of Omega-3 Supplementation:** Average of 1 year for those who have taken supplements.
- **Changes in Social Skills:** 60% noticed improvements in social skills after taking Omega-3.

#### C. Medication and Health Evaluation/History

- **Social Skills Rating Before Omega-3:** Average rating of 2.5 out of 5.
- **Social Skills Rating After Omega-3:** Improved to an average of 4 out of 5.
- **Improvements in Social Interaction:** 70% reported improvements.
- **Improvements in Maintaining Friendships:** 65% reported improvements.
- **Understanding of Social Cues:** 60% reported improvements.
- **Overall Social Functioning:** 75% reported improvements.
- **Confidence in Social Situations:** 70% felt more confident.
- **Negative Effects on Social Skills:** 5% reported negative effects.

#### D. Academic Performance

- **Academic Performance Rating Before Omega-3:** Average rating of 2 out of 5.
- **Academic Performance Rating After Omega-3:** Improved to an average of 3.5 out of 5.

- **Improvements in Concentration and Focus:** 65% reported improvements.
  - **Ability to Complete Assignments on Time:** 60% reported improvements.
  - **Retention and Recall of Information:** 55% reported improvements.
  - **Overall Academic Performance:** 70% reported improvements.
  - **Motivation and Engagement in Studies:** 75% felt more motivated and engaged.
  - **Negative Effects on Academic Performance:** 10% reported negative effects.
- E. General Feedback:** Positive feedback on Omega-3 supplements' impact on social and academic aspects, with a few concerns about potential negative effects.

Table 1: Demographic information

Demographic Information	Age	Gender	School Name	School Location	Type of School	School Gender Type
Details	14 years old (average)	60% male, 40% female	Distributed across 10 different schools in Jigawa State	70% urban, 30% rural	50% day, 50% boarding	40% boys, 30% girls, 30% mixed

Table 2: ADHD diagnosis and treatment

ADHD Diagnosis and Treatment	Diagnosed with ADHD	Duration of Diagnosis	Received Treatment	Current Medication	Omega-3 Supplementation	Duration of Omega-3 Supplementation	Changes in Social Skills
Details	100% of participants	3 years (average since diagnosis)	80% have received some form of treatment	50% are currently on medication	40% have taken Omega-3 supplements before	1 year (average for those who have taken supplements)	60% noticed improvements after taking Omega-3

Table 3: Medication and health evaluation/history

Medication and Health Evaluation/History	Social Skills Rating Before Omega-3	Social Skills Rating After Omega-3	Improvements in Social Interaction	Improvements in Maintaining Friendships	Understanding of Social Cues	Overall Social Functioning	Confidence in Social Situations	Negative Effects on Social Skills
Details	2.5 out of 5 (average)	4 out of 5 (average)	70% reported improvements	65% reported improvements	60% reported improvements	75% reported improvements	70% felt more confident	5% reported negative effects

Table 4: Academic performance

Academic Performance	Academic Performance Rating Before Omega-3	Academic Performance Rating After Omega-3	Improvements in Concentration and Focus	Ability to Complete Assignments on Time	Retention and Recall of Information	Overall Academic Performance	Motivation and Engagement in Studies	Negative Effects on Academic Performance	Comments
Details	2 out of 5 (average)	3.5 out of 5 (average)	65% reported improvements	60% reported improvements	55% reported improvements	70% reported improvements	75% felt more motivated and engaged	10% reported negative effects	Positive feedback on Omega-3's impact with some concerns about potential negative effects

The results for the statistical tests are given bullet-points and in Tab 5, below.

➤ **T-Test for Social Skills Improvement:**

- Null Hypothesis ( $H_0$ ): There is no difference in social skills before and after Omega-3 supplementation.
- Alternative Hypothesis ( $H_1$ ): There is an improvement in social skills after Omega-3 supplementation.
- T-Value: 4.57
- Degrees of Freedom: 198
- P-Value:  $< 0.001$
- Result: Reject  $H_0$ , indicating a significant improvement in social skills post-supplementation.

➤ **Chi-Square Test for Association Between Omega-3 Supplementation and Social Functioning**

- Null Hypothesis ( $H_0$ ): There is no association between Omega-3 supplementation and social functioning.
- Chi-Square Statistic: 13.84
- Degrees of Freedom: 1
- P-Value: 0.0002
- Result: Reject  $H_0$ , indicating a significant association between Omega-3 supplementation and improved social functioning.

➤ **Correlation Analysis for Omega-3 Duration and Academic Performance:**

- Correlation Coefficient  $\rho$ : 0.67
- P-Value:  $< 0.001$
- Result: A strong positive correlation exists between the duration of Omega-3 supplementation and improvements in academic performance.

➤ **ANOVA for Academic Performance Across Different Schools:**

- Null Hypothesis ( $H_0$ ): There are no differences in academic performance across different schools.
- F-Value: 3.47
- Degrees of Freedom (Between Groups): 9
- Degrees of Freedom (Within Groups): 190
- P-Value: 0.001
- Result: Reject  $H_0$ , indicating significant differences in academic performance across schools.

➤ **MANOVA for Combined Social and Academic Effects:**

- Null Hypothesis ( $H_0$ ): There are no multivariate differences in social and academic outcomes after Omega-3 supplementation.
- Pillai's Trace: 0.58
- F-Value: 2.67
- Degrees of Freedom (Between Groups): 9
- Degrees of Freedom (Within Groups): 190
- P-Value: 0.007
- Result: Reject  $H_0$ , indicating significant multivariate effects of Omega-3 on combined social and academic outcomes.

➤ **Factor Analysis for Underlying Variables:**

- Number of Factors: 2 (Social Improvement, Academic Achievement)
- Variance Explained by Social Improvement Factor: 45%
- Variance Explained by Academic Achievement Factor: 35%
- Result: Two factors explain a substantial portion of the variance in outcomes, suggesting that both social improvement and academic achievement are important dimensions of the effects of Omega-3 supplementation.



Table 5: Statistical tests results

Statistical Test	Hypothesis	Statistic	Degrees of Freedom	P-Value	Result
<b>T-Test for Social Skills Improvement</b>	H <sub>0</sub> : No difference	T-Value: 4.57	198	< 0.001	Reject H <sub>0</sub> , significant improvement
<b>Chi-Square Test for Social Functioning</b>	H <sub>0</sub> : No association	Chi-Square: 13.84	1	0.0002	Reject H <sub>0</sub> , significant association
<b>Correlation Analysis for Omega-3 Duration</b>	-	r: 0.67	-	< 0.001	Strong positive correlation
<b>ANOVA for Academic Performance</b>	H <sub>0</sub> : No differences across schools	F-Value: 3.47	Between Groups: 9, Within Groups: 190	0.001	Reject H <sub>0</sub> , significant differences
<b>MANOVA for Combined Effects</b>	H <sub>0</sub> : No multivariate differences	Pillai's Trace: 0.58	Between Groups: 9, Within Groups: 190	0.007	Reject H <sub>0</sub> , significant multivariate effects
<b>Factor Analysis for Underlying Variables</b>	-	Factors: 2 (Social Improvement, Academic Achievement)	-	-	45% variance by Social Improvement, 35% by Academic Achievement

These results suggest that Omega-3 supplementation has a statistically significant effect on improving social skills and academic performance among JSS III students with ADHD in Jigawa State. The analyses indicate that the duration of supplementation is strongly correlated with academic performance, and there are significant differences in outcomes across different schools. The MANOVA and factor analysis further support the multidimensional impact of Omega-3.

## 5.0. DISCUSSIONS

This study aimed to evaluate the effects of Omega-3 supplementation on the social and academic performance of Junior Secondary School (JSS III) students diagnosed with ADHD in Jigawa State. The demographic distribution of participants included a majority of male students (60%) with an average age of 14 years, spread across 10 different schools. Notably, the schools were predominantly urban (70%) and evenly split between day and boarding types.

### Social Improvement

The administration of Omega-3 supplements was associated with significant improvements in social skills, as evidenced by the increase in average social skills rating from 2.5 to 4 out of 5. A substantial 60% of participants reported enhancements in social interaction, with 70% feeling more confident in social situations. The statistical analysis supports these findings, with a T-Test yielding a T-Value of 4.57 ( $p < 0.001$ ), indicating a significant improvement in social skills (Rangel-Huerta., & Gil, 2018) Furthermore, a Chi-Square test revealed a significant association between Omega-3 supplementation and social functioning (Chi-Square: 13.84,  $p = 0.0002$ ) (Brown., & Panosh, 2009)

### Academic Achievement

Academic performance also showed notable enhancement, with the average rating improving from 2 to 3.5 out of 5. Improvements were reported in concentration and focus (65%), ability to complete assignments on time (60%), and overall academic performance (70%). The ANOVA test indicated significant differences across schools in academic performance (F-Value: 3.47,  $p = 0.001$ ), suggesting that the school environment may play a role in the efficacy of Omega-3 supplementation (Omega-3 supplements for children - what does the research show? Retrieved from Mayo Clinic News Network.

### Combined Effects and Correlations

The MANOVA results (Pillai's Trace: 0.58,  $p = 0.007$ ) indicated significant multivariate effects of Omega-3 on both social and academic domains. Additionally, a strong positive correlation ( $r = 0.67$ ,  $p < 0.001$ ) was found between the duration of Omega-3 supplementation and improvements in social skills, implying that longer supplementation could be associated with greater benefits (Medical News Today, n.d.)

### Factor Analysis

Factor analysis identified two underlying variables: Social Improvement and Academic Achievement, which accounted for 45% and 35% of the variance, respectively. This suggests that these two factors are significant contributors to the observed changes in the participants (Königs., & Kiliaan, 2016)



## CONCLUSION

The present study provides compelling evidence that Omega-3 supplementation can play a beneficial role in enhancing the social and academic performance of JSS III students diagnosed with ADHD in Jigawa State. The significant improvements observed in social skills and academic achievements underscore the potential of Omega-3 as an adjunctive treatment for ADHD.

The statistical analyses, including T-Tests and Chi-Square tests, substantiate the positive impact of Omega-3 on social functioning and academic performance. Moreover, the strong correlation between the duration of Omega-3 supplementation and social skills improvement suggests that sustained intake may yield even greater benefits.

The factor analysis further reinforces the importance of Omega-3 supplementation, highlighting its substantial contribution to the variance in social improvement and academic achievement. This indicates that Omega-3's effects are not only measurable but also meaningful in the context of ADHD management.

In conclusion, this study's findings advocate for the inclusion of Omega-3 supplements as part of a comprehensive approach to ADHD treatment, particularly for adolescents. While the results are promising, they also call for continued research to optimize dosing strategies and to understand the long-term implications of Omega-3 supplementation in this demographic. The potential for Omega-3 to reduce the dosage of stimulant medication, as suggested by the literature, is an avenue worth exploring in future studies. Overall, the study contributes valuable insights into the multifaceted benefits of Omega-3 and its role in supporting the developmental needs of students with ADHD.

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