

# The Association between Dietary Intake of Omega-3 and Cognitive Abilities among Female University Students in Kingdom of Saudi Arabia.

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## Background

Omega-3 polyunsaturated fatty acids (n-3 PUFAs) are dietary factors that have received significant research attention in relation to their beneficial effects on cognitive decline ( Handeland et al,2018). The main n-3 PUFAs used in the body are docosahexaenoic acid (DHA) and Eicosapentaenoic acid (EPA) ( Bentsen,2017) , and are mostly obtained from oily fish or dietary supplementation. DHA and EPA can also be synthesized from  $\alpha$ -linolenic acid (ALA) obtained from plant oils (Domenichiello et al, 2015).

## Objectives

- 1- To find out the correlation between n-3 PUFAs consumption and cognitive abilities among late adolescents.
- 2- To compare the cognitive abilities between students from two different tracks in IAU.

## Methodology

### Participants:

This cross-sectional study was carried out on ( N=100) female students. Participants were selected by convenience sampling method from College of Applied Medical Sciences ( CAMS ) (n=70) and College of Applied Studies and Community Services (n=30) .

### Data Assessment and Statistical Analysis Tools:

- 1) Questionnaire (Demographic data, health history, life style and food consumption)
- 2) Cognitive tests (Digit Span Test for memory ability and Digit Cancellation Test for attention ability)
- 3) Food Frequency Questionnaire (FFQ).
- 4) Anthropometric measurements (body weight, body height and BMI).
- 5) Statistical analysis using software –IBMSPSS Statistics 25 ; methods – Pearson correlation coefficient , chi-square test ; t-test , and Kruskal Wallis H test .

### Ethical Approval

All procedure performed were in accordance with the ethical standards of IAU (IRB-UGS-2018-03-265).

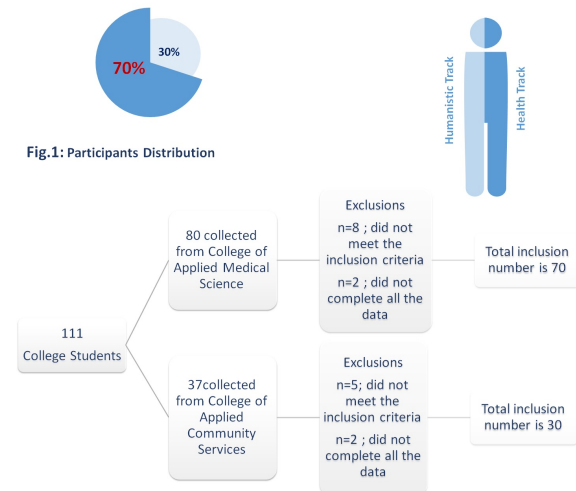


Fig.1: Participants Distribution

## Results

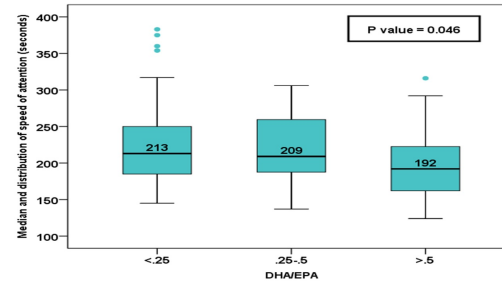


Fig.2: Correlation between dietary intake of DHA/EPA and working memory

Table1: Correlations between FFQ and Mental abilities (Attention and Memory).

Variables	r	P. value
FFQ & Speed of Attention	0.021	0.642
FFQ & Accuracy of Attention	0.345	<0.001
FFQ & Immediate Memory	0.310	0.002
FFQ & Working Memory	0.128	0.318

Table2: Correlations between ALA and Mental abilities (Attention and Memory).

Variables	r	P. value
ALA & Speed of Attention	0.013	0.896
ALA & Accuracy of Attention	0.239	0.015
ALA & Immediate Memory	0.072	0.470
ALA & Working Memory	0.090	0.368

Table3: Association between FFQ and Speed of attention.

Consumption of food items		Speed of Attention		p. value
		Fast n(%)	Slow n(%)	
White Fish	Low	47(58)	34(42)	0.033
	Moderate	16(84)	3(16)	
Cashew	Low	28(51)	27(49)	0.015
	Moderate	32(80)	8(20)	
	High	3(60)	2(40)	

The speed of attention was statistically significant among the DHA/EPA levels (Fig.2). As shown in Table1, there is a positive correlation between FFQ with accuracy of attention and immediate memory ( $r=0.345, P<0.001; r=0.310, P<0.002$  respectively). Accuracy of attention increases as dietary intake of ALA increases as ( $r=0.239, P=0.015$ ). Also, moderate consumption of cashew indicates a speed of attention ( $p=0.015$ ). Among low consumption of white fish, 58% were with speed of attention, while among (Table2), moderate consumption group 84% were with speed of attention which is statistical significance ( $P=0.033$ ) (Table3).

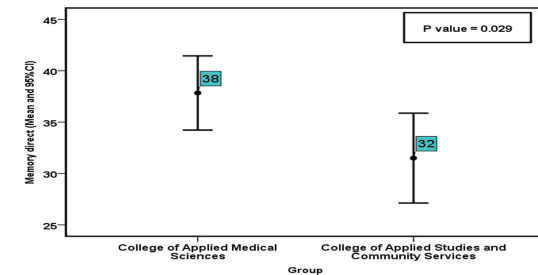


Fig.3: Comparison between the two colleges and Immediate memory

Table4: Comparison of FFQ, ALA and DHA/EPA between the two Tracks.

Variables	Health Track	Humanistic Track	t-test	P. value
FFQ	33.70 (15.78)	34.86 (13.63)	-0.37	0.709
ALA	169.00 (53.41)	104.79 (81.35)	1.19	0.235
DHA/EPA	388.63 (52.56)	252.01 (22.11)	1.99	0.045

Table5: Comparison of cognitive ability between two Tracks.

Variables	Health Track	Humanistic Track	t-test	P. value
Speed of Attention	213.68 (52.82)	223.81 (59.76)	-0.86	0.392
Accuracy of Attention	6.01 (5.87)	7.97 (10.07)	-1.23	0.213
Immediate Memory	38.06 (2.83)	31.50 (13.30)	2.33	0.029
Working Memory	23.88 (13.05)	22.89 (12.36)	0.38	0.703

## Discussion

In the present study, the speed of attention was high in the group who consume > 0.5 gm of DHA/EPA daily, moderate consumption of white fish and cashew. These results were in agreement with those previously reported by (Welma et al., 2013), (Patan and Jackson.,2016), and (Handeland et al., 2018). Furthermore, the cognitive abilities and the intake of omega3 were higher in CAMS compared with College of Applied Studies and Community Services. However, the significance was only in immediate memory; these findings are in the same line with those previously reported by (Zhang et al.,2017),( Talukdar et al., 2018),and (Royo et al.,2018).

## Conclusion

The present study provides further experimental evidence that n-3 PUFAs exert positive effects on cognitive abilities in healthy late adolescents. Therefore, improvement of dietary intake of n-3 PUFAs may lead to improvement in mental and cognitive abilities.

## Acknowledgement

We gratefully acknowledge our families for the support and motivation and the participants for making this research possible.

## References

