Impact of Nutrition on Memory and Cognitive Function Female of Teenage Al-Shimaa Secondary School Students in Zliten

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تأثير التغذية على الذاكرة والوظائف الإدراكية لدى طالبات مدرسة الشيماء الثانوية في زليتن

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Abstract

By avoiding processed junk food and switching to a healthy diet rich in fiber and antioxidants, people can actually improve memory, brain development, and decrease the effects of conditions like Alzheimer's disease. They will also feel more focused, alert, and aware, and their cognitive performance will improve. The design of this study was a descriptive survey method. The study was conducted on Al-Shimaa School students, and 100 samples were selected, 97 of whom were answered, during the period from15th of February 2024 to 20thof May 2024.The data was analyzed and it was found that There is a correlation between frequent consumption of pastries and forgetting the phone code or phone number, a relationship between difficulty in memory and comprehension when studying, forgetting information before the exam and eating eggs during the day, Also it was shown that there is a -ve correlation (P<0.01) between forgetting schoolwork and using omega-3 pills and eating eggs , with a strength of 33%. This indicates that if the rate and use of omega-3 pills decreases, the person will be vulnerable to forgetfulness, which is represented by

forgetting schoolwork .The study concluded that Following healthy diet containing nutrients essential for brain health, such as Omega-3, Vitamin E, Vitamin B12, and iron, healthy life style is essential to improve cognitive function and boost students memory, recommendation were made to overcome this problem.

Keywords: *Cognitive function, Memory, Forgetfulness, Omega-3.*

الملخص

يمكن للأغذية المحددة في الواقع تحسين الذاكرة ,والوقاية من أمراض الدماغ، وتقليل أثار حالة النسيان مثل: مرض الزهايمر بمجرد الابتعاد عن الأغذية السريعة المصنعة وتناول غذاء صحي غني بالألياف ومضادات الأكسدة سيشعر فجأة بمزيد من اليقظة والوعي والتركيز ، مع زيادة المستوى المعرفي إلى مستوى أعلى. هذه الدراسة طريقة مسح وصفية، أجريت الدراسة على طالبات مدرسة الشيماء الثانوية وتم اختيار 100 عينة، 97 منها تم الرد عليه، وكان ذلك خلال الفترة من (15-2-2024 إلى 20-5-2024). تم تحليل البيانات ووجد أن هناك علاقة بين الاستهلاك المتكرر للمعجنات ونسيان رمز الهاتف أو رقم الهاتف، وهناك علاقة أيضا بين صعوبة الذاكرة والفهم عند الدراسة و نسيان المعلومات قبل الامتحان، كما تبين أن هناك علاقة بين نسيان الواجب المدرسي واستخدام حبوب الأوميغا 3 وتناول البيض، بقوة 33% يشير هذا إلى أنه إذا انخفض معدل استخدام حبوب الأوميغا-3، فسيكون الطالب عرضة للنسيان، والذي يمثله نسيان الواجب المدرسي. لخصت الدراسة إلى أن إتباع نظام غذائي صحي يحتوي على عناصر غذائية ضرورية لصحة الدماغ مثل أوميغا-3 وفيتامين إي وفيتامين بي12 والحديد، و إتباع أسلوب حياة صحي ضروري لتحسين الوظيفة المعرفية وتعزيز ذاكرة الطلاب، وقدمت التوصية للتغلب على هذه المشكلة.

الكلمات الدالة: الوظيفة الإدراكية، الذاكرة، النسيان، أوميجا-3.

1. Introduction

In the scientific pursuit of understanding how the brain controls eating, the areas of the brain linked to hunger, fullness, and pleasure have gotten the most attention. However, a critical question in behavioral neuroscience that has gotten less attention is how top-down cognitive processes like memory modulate energy intake (Via & Contreras-Rodríguez, 2023). Evidence suggests that hippocampal-dependent episodic memory of recent eating (Brickman et al., 2023). Every food item and beverage you consume throughout the day, whether as part of a regular meal or an occasional snack break, contains a unique set of nutrients (Warde, 2024). These include macronutrients like proteins, carbohydrates, and fats, which give the body and brain the major building blocks they need to survive. In addition, there are numerous micronutrients, which are tiny minerals, vitamins, and other molecules necessary for the healthy functioning of the human brain (Hawkesford et al., 2023). These molecules and nutrients can affect everything from neuroplasticity to enzymatic activity (Works et al., 2023). Surprisingly little is known about the relationships between these substances and their effects on brain health and cognitive function (Mallick & Duttaroy, 2023). Maintaining a nutritious diet is crucial for overall health, and it may even help prevent or slow the onset of Alzheimer's disease (Khemka et al., 2023). The science of therapeutic nutrition examines the role of nutrition in a variety of pathological conditions as well as the impact of food ingredients and their significance for the body's

growth, health, and safety (Townsend et al., 2023). It is undeniable that maintaining a healthy diet and consuming particular foods and beverages can enhance brain function and memory (Park, 2023). The brain is made up of substances found in food (sometimes only vitamins, minerals, essential amino acids, and essential fatty acids, such as Omega-3 polyunsaturated fatty acids (Smolińska et al., 2024). Because different brain cells have specialized functions that require specific nutrients to perform, the brain needs these nutrients to build and maintain its structure, both to function harmoniously and to prevent premature aging (Castellani et al., 2023). The brain therefore has priority when it comes to supplies, and it is served before the other organs; if necessary, it can even draw on their reserves and weaken them (Sterling & Laughlin, 2023). The brain is extremely well protected by a "wall", the blood-brain barrier, but that doesn't change the fact that the brain needs these nutrients to build and maintain its structure (Barker, 2024). The parts of the brain associated with hunger, fullness, and pleasure have received the greatest attention in the scientific effort to understand how the brain regulates eating. However, how top-down cognitive processes like memory control energy intake is a crucial subject in behavioral neuroscience that has received less attention. (Nogueira-de-Almeida et al., 2023). The development of the body and mind is significantly influenced by hemoglobin and other micronutrients (Bustami et al., 2024). Iron, vitamin B12, and folate deficiencies have been linked to poor cognitive development, loss of concentration, and even lower intelligence (John et al., 2023). Micronutrients are essential components of diet that are required for a wide range of physiological and cognitive functions (Chakraborty, 2023). Zinc and vitamin D deficiencies have also been linked to reported impairments in behavior and cognition (Huzayyin et al., 2024). Every vitamin is necessary for the brain to function normally (Saidi et al., 2023).

1.1. Objectives of the study

Find out the relation between nutrition and cognitive function, forgetfulness among school female students aged (15–20) years.

1.2. Problem of the study

- Increase of forgetfulness and low concentration between school students.
- Increase of unhealthy sweetened food consumption.

1.3. Significance of study

Increase knowledge about the cause of low concentration and low school performance.

2. Materials & Methods

Permission to conduct the study was obtained for the first time and was granted by the high school officials. Obtaining the participant's consent and grant the freedom to collect the answer to the questionnaire from the students. The study conducted in Al-Shimaa high school in Zliten, from February 15-2024 to 20 may

2024. Samples were taken from 100 female students of different ages from 15 to 20: (First secondary, Second secondary, and Third secondary school). The number of classes for the first year of high school was 9 classes, and the number of students was 20-25 in each class. As for the second year of high school, the number of classes was 7 classes, and the number of students was 20-25 in each class. As for the second year of high school, the literary section, there were two classes, and the number of students was 12-15. As for the third year of high school, the scientific section, there were 7 classes, and the number of students was approximately 20-25 students in each class. As for the third year of high school, the literary section, there were 3 classes, and the number of students was 12-15 students in each class. The response rate was 97, due to the loss of some of the questionnaire papers. The questionnaire was distributed randomly and was translated in Arabic.

2.1. Research Design

The design of this study was a cross sectional study random sample method.

2.2. Study Population and Sampled

The Library of Academic Affairs at the College of Health Sciences granted ethical approval to study perception and its relationship to food in Zliten, a study based on a group of female students aged 15 to 20 years at Al-Shimaa High School.

2.2.1. Side Title:

Impact of Nutrition on Memory and Cognitive Function Female of Teenage Al-Shimaa Secondary School Students in Zliten

3. Results & Discussion

Q1/ Do you eat a lot of pastries?

Table (1) show statistics of the study sample's responses about eating pastries a lot. It was found that there is a significant difference ($p<0.01$) between the study sample's responses at a 1% level of significance, as it was noted that 39% eat pastries a lot, and 33% sometimes eat pastries a lot. While the remaining 28% of the study sample doesn't eat a lot of pastries. In general, the results of the relative weight of the study sample's responses showed that 70% eat pastries a lot.

Table1. Results of the study sample's responses to the question: Do you eat a lot of pastries?

response	Frequency	Percent	Mean	relative weight	Std. Deviation	test value	(p-value)
No	27	27.8	2.1134	0.70	0.814917	9.536	0.008**
Sometimes	32	33					
Yes	38	39.2					
Total	97	100					

* Statistically significant at 5%. **Statistically significant at 1%

Q2/ Study the relationship between indicators of forgetfulness (weak memory, lack of concentration, and forgetfulness) and consumption of soda drinks and ready-to-eat and fast food.

The correlation between indicators of forgetfulness (weak memory, lack of concentration, and forgetfulness) and eating ready-to-eat and fast food was studied using the Spearman correlation coefficient. The results in Table (2) showed that there is a +ve correlation (P<0.05) between eating a lot of pastries and forgetting the phone code or phone number, with a strength of 25%. This indicates that if the rate of eating pastries increases, the person will be vulnerable to forgetfulness, which is represented by forgetting the code. Telephone or phone number. While it was found that there is no statistically significant correlation (P>0.05) between the rest of the variables.

Table 2. Results of the relationship between indicators of forgetfulness, consumption of soda drinks, and ready-to-eat and fast food

		Do you like soda dinks?	Do you eat Indomie?	Do you like fried foods a lot?	Do you eat a lot of pastries?	Do you prefer sweets as snacks?
Have you ever forgotten the exam date?	Corr. coefficient	0.182	0.012	0.052-	0.040	**0.127**
	(p-value)	0.074	0.908	0.614	0.694	**0.217**
Do you suffer from difficulty in memory and comprehension when studying?	Corr. coefficient	0.133	0.113-	0.083-	0.073	**0.020-**
	(p-value)	0.193	0.271	0.417	0.478	**0.846**
Do you forget your phone code or phone number?	Corr. coefficient	0.056-	0.162	0.078-	*0.245	**0.062**
	(p-value)	0.585	0.114	0.447	0.016	**0.546**
Do you forget your school homework?	Corr. coefficient	0.114	0.062-	0.052	0.129	**0.016**
	(p-value)	0.267	0.546	0.611	0.206	**0.879**
Do you suffer from forgetting information in the exam?	Corr. coefficient	0.181	0.004	0.017-	0.084	**0.074**
	(p-value)	0.076	0.967	0.873	0.413	**0.471**

* Statistically significant at 5%. **Statistically significant at 1%

The current study agreed with Kaur and Sharma (2018) who study the relationship of fast food consumption and memory retention +v correlation was observed between attention span and memory retention.

Q3/ Study the relationship between indicators of forgetfulness (weak memory, lack of concentration, and forgetfulness) and following a healthy diet

The correlation between indicators of forgetfulness (weak memory, lack of concentration, and forgetfulness) and following a healthy diet was studied using the Spearman correlation coefficient. The results in Table (3) showed that there is a -ve correlation (P<0.01) between difficulty in memory and comprehension when studying and eating eggs during the day reached a strength of 33%. Also, it was found that there was a -ve correlation (P<0.01) between forgetting information in the exam and eating eggs during the day with a strength of 29%. This indicates that if the rate of eating eggs during the day decreases, the person will be prone to forgetfulness, which is represented by difficulty in memory and comprehension when studying, and forgetting information in the exam. While it was found that there is no statistically significant correlation (P>0.05) between the rest of the variables.

Table 3. Results of the relationship between indicators of forgetfulness and following a healthy diet

		Do you eat liver?	-Do you eat eggs during the day?	Do you eat red meat?	-Do you eat fish regularly?
Have you ever forgotten the exam date?	Correlation coefficient	0.128-	0.002	0.071-	0.031
	(p-value)	0.212	0.984	0.487	0.762
Do you suffer from difficulty in memory and comprehension when studying?	Correlation coefficient	0.083-	**0.334-	0.102-	0.047-
	(p-value)	0.418	0.001	0.320	0.651
Do you forget your phone code or phone number?	Correlation coefficient	0.151-	0.061-	0.124-	0.117-
	(p-value)	0.139	0.553	0.228	0.255
Do you forget your school homework?	Correlation coefficient	0.018-	0.123	0.111-	0.110-
	(p-value)	0.862	0.229	0.281	0.283
Do you suffer from forgetting information in the exam?	Correlation coefficient	0.096-	**0.285-	0.057-	0.119-
	(p-value)	0.349	0.005	0.578	0.246

* Statistically significant at 5%. **Statistically significant at 1%

Q4/ Study the relationship between indicators of forgetfulness (weak memory, lack of concentration, and forgetfulness) and following a healthy lifestyle

The correlation between indicators of forgetfulness (poor memory, lack of concentration, and forgetfulness) and followers of a healthy lifestyle was studied using the Spearman correlation coefficient. The results in Table (4) showed that there is a -ve correlation ($P<0.05$) between difficulty in memory and comprehension when studying and drinking water naturally reached a strength of 25%, and there is also a -ve correlation ($P<0.01$) between forgetting the telephone code or phone number and drinking water naturally whose strength reached 27%, and that there is a –ve correlation ($P<0.05$) between forgetting information in the exam and drinking water normally reached a strength of 25%. This indicates that if the rate of drinking water naturally decreases, the person will be vulnerable to forgetfulness, which is represented by difficulty in memory and comprehension when studying, forgetting the telephone code or phone number, and forgetting information in the exam. Also it was shown that there is a -ve correlation ($P<0.01$) between forgetting schoolwork and using omega-3 pills, with a strength of 33%. This indicates that if the rate and use of omega-3 pills decreases, the person will be vulnerable to forgetfulness, which is represented by forgetting schoolwork. While it was found that there is no statistically significant correlation ($P>0.05$) between the rest of the variables.

Q5/ Study the relationship between indicators of forgetfulness (weak memory, lack of concentration, and forgetfulness) and following an unhealthy lifestyle

The correlation between indicators of forgetfulness (weak memory, lack of concentration, and forgetfulness) and followers of an unhealthy lifestyle was studied using the Spearman correlation coefficient. The results in Table (5) showed that there is a +ve correlation ($P<0.05$) between forgetting information in the exam and feeling. The strength of fatigue even after the rest period reached 24%, and this indicates that if the rate of feeling exhausted increases even after the rest period, the person will be vulnerable to forgetfulness, which is represented by forgetting information in the exam. While it was found that there is no statistically significant correlation ($P>0.05$) between the rest of the variables where the study sample s responses showed that 46% of female students were anemic. This study was not agree with Qin et al (2019) who conducted study to find out association between anemia and cognitive decline among Chinese middle aged people.

Table 4. Results of the relationship between indicators of forgetfulness and followers of a healthy lifestyle

		Do you use Omega-3 pills?	Are you exposed to the sun in the morning for enough time?	Do you drink water normally (at least a liter and a half)?	Do you sleep seven hours or more at night?	Do you eat three main meals a day?	Do you eat breakfast before going to school?
Have you ever forgotten the exam date?	Corr. coefficient	0.186-	0.065-	0.053-	0.015-	0.030	**0.106-**
	(p-value)	0.068	0.527	0.607	0.882	0.774	**0.302**
Do you suffer from difficulty in memory and comprehension when studying?	Cor. coefficient	0.074-	0.061	*0.490-	0.037	0.001	**0.070-**
	(p-value)	0.470	0.556	0.014	0.722	0.998	**0.497**
Do you forget your phone code or phone number?	Corr. coefficient	0.122-	0.038-	**0.271-	0.038	0.181	**0.022-**
	(p-value)	0.233	0.710	0.007	0.712	0.076	**0.833**
Do you forget your school homework?	Corr. coefficient	**0.327-	0.011	0.165-	0.089	0.195	**0.064-**
	(p-value)	0.001	0.916	0.107	0.385	0.056	**0.536**
Do you suffer from forgetting information in the exam?	Corr. coefficient	0.006-	0.005-	*0.251-	0.022	0.045-	**0.119-**
	(p-value)	0.955	0.958	0.013	0.831	0.658	**0.245**

* Statistically significant at 5%. ** Statistically significant at 1%

Table 5. Results of the relationship between indicators of forgetfulness and following an unhealthy lifestyle

		Do you feel tired even after a rest period?	Do you use the Internet a lot?	Do you suffer from anemia?
Have you ever forgotten the exam date?	Corr. coefficient	0.087	0.006	**0.070**
	(p-value)	0.399	0.954	**0.495**
Do you suffer from difficulty in memory and comprehension when studying?	Corr. coefficient	0.182	0.118-	**0.100**
	(p-value)	0.074	0.251	**0.332**
Do you forget your phone code or phone number?	Corr. coefficient	0.038	0.017	**0.155-**
	(p-value)	0.714	0.869	**0.130**
Do you forget your school homework?	Corr. coefficient	0.157	0.071-	**0.070**
	(p-value)	0.125	0.488	**0.495**
Do you suffer from forgetting information in the exam?	Corr. coefficient	*0.236	0.004	**0.053**
	(p-value)	0.020	0.969	**0.607**

* Statistically significant at 5%. ** Statistically significant at 1%

4. Conclusion

The study concluded that, the indicators of forgetting in the responses of the study sample, that most students suffer from forgetting information in the exam, difficulty in memory and comprehension when studying also forget school work and the exam date. Which can be contributed to students prefer to drink cola and eat sweets, fried foods a lot, eat a lot of pastries. There was a +ve correlation between eating a lot of pastries and forgetting the telephone code or phone number in current study. A +ve correlation between forgetting information in the exam and feeling exhausted even after the rest period. It can be said that a healthy lifestyle helps brain development and enhances memory, as it has been shown that lack of hours of sleep causes a feeling of fatigue, which can lead to a defect in cognitive processes.

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