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Assessment of Healthcare Workers' Compliance with the MIND Diet

Sağlık Çalışanlarının MIND Diyete Uyumunun Değerlendirilmesi

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ABSTRACT

Objectives: This study aimed to evaluate adherence to the MIND diet, a nutrition plan designed to protect brain health in healthcare workers operating under conditions such as heavy workload, job stress, shift work, and irregular eating habits.

Methods: The study was conducted between 1 and 31 July 2025 at Fatih Sultan Mehmet Training and Research Hospital in Istanbul, Türkiye, with 310 healthcare workers who volunteered for the study, selected through random sampling. Data were collected using a 15-item MIND diet scale calculated based on data from a sociodemographic information questionnaire and an adult semi-quantitative food frequency questionnaire. A total score of 0–15 could be obtained from the scale. A high score indicates high adherence to the diet.

Results: The median MIND score of the healthcare workers participating in the study was calculated as 7.5. While MIND diet scores did not differ according to gender, BMI, educational status, occupation, and marital status ($p>0.05$), a statistically significant relationship was found between income status and MIND adherence ($p=0.025$). Individuals with high MIND diet adherence rated their income status as good at a higher rate.

Conclusion: The components of the MIND diet should be evaluated in relation to the dietary habits and cultural background of the population being studied. Although it was thought that participants in this study, being healthcare professionals, would consume foods with various antioxidant properties more frequently in their diets in order to prevent age-related cognitive decline and protect brain health, their adherence to the MIND diet was unexpectedly low.

Keywords: Cognitive function; dementia; MIND diet; nutrition.

ÖZET

Amaç: Bu çalışmada yoğun iş yükü, iş stresi, vardiyalı çalışma ve düzensiz beslenme gibi koşullar altında çalışan sağlık çalışanlarının, beyin sağlığını korumayı amaçlayan bir beslenme planı olan MIND diyetine uyumunun değerlendirilmesi amaçlanmıştır.

Yöntem: Çalışma, 1–31 Temmuz 2025 tarihleri arasında Türkiye'nin İstanbul ilinde bulunan Fatih Sultan Mehmet Eğitim ve Araştırma Hastanesinde, rastgele örnekleme yöntemi ile çalışmaya gönüllü olan 310 sağlık çalışanı ile yapılmıştır. Veriler, sosyodemografik bilgiler anketi ve erişkin yarı kantitatif besin sıklığı anketi verilerine göre hesaplanan, 15 sorudan oluşan MIND diyet ölçeği ile toplanmıştır. Ölçekten toplam 0–15 arasında puan alınabilmektedir. Yüksek puan, diyete yüksek uyum anlamına gelmektedir.

Bulgular: Çalışmaya katılan sağlık çalışanlarının MIND ortanca puanı 7,5 olarak hesaplanmıştır. MIND diyet puanları cinsiyet, BKİ, eğitim durumu, meslek ve medeni duruma göre farklılık göstermezken ($p>0,05$), gelir durumu ile MIND uyumu arasında istatistiksel olarak anlamlı bir ilişki bulunmuştur ($p=0,025$). MIND diyet uyumu yüksek olan bireyler, gelir durumlarını daha yüksek oranda "iyi" olarak değerlendirmektedir.

Sonuç: MIND diyetinin bileşenleri, incelenen popülasyonun beslenme alışkanlıkları ve kültürel geçmişleri ile ilişkili olarak değerlendirilmelidir. Bu çalışmada katılımcıların sağlık çalışanı olması sebebiyle, yaşlanmaya bağlı bilişsel işlev gerilemesini engellemeyi ve beyin sağlığını korumayı amaçlayan çeşitli antioksidan özellikler taşıyan gıdaları diyetlerinde daha sık tükettikleri düşünülmesine rağmen, MIND diyetine uyumları beklenenin aksine düşük bulunmuştur.

Anahtar sözcükler: Bilişsel; beslenme; demans; MIND diyet.

Interest in dietary habits as a potential strategy to prevent cognitive decline is growing.[1] The Mediterranean diet (MeDi) is a frequently studied dietary model and has been found to be associated with a slower rate of cognitive decline.[2] A dietary pattern that has been less studied in relation to cognitive function is the Dietary Approaches to Stop Hypertension (DASH) diet. However, neither the MeDi nor the DASH diets contain specific nutrients that optimise brain health.[3] Recently, a combination of these two dietary patterns was developed by Morris and colleagues.[4] This model is the Mediterranean DASH Intervention for Neurodegenerative Delay (MIND) diet. The MIND diet is a plant-based dietary model aimed at protecting brain health, emphasising foods such as green leafy vegetables, whole grains, fish, poultry, and olive oil, while limiting the consumption of red meat, processed foods, butter, and sweets.[5]

Although the Mediterranean and DASH diets have protective effects on cardiovascular health, the MIND diet has been associated with a reduced risk of Alzheimer's disease, particularly by emphasising the consumption of green leafy vegetables and fruits.[6] Long-term adherence to the MIND diet has been reported to strengthen verbal memory, but it cannot completely prevent cognitive decline in older age.[7] Furthermore, the hypocaloric MIND diet provides more significant improvements in weight loss and body fat percentage compared to diets based solely on calorie restriction.[8] Antioxidant components in the diet, such as vitamin E, folate, flavonoids, and carotenoids, exert a protective effect against neurodegenerative processes by reducing β-amyloid accumulation.[9] Furthermore, it targets mechanisms involved in the development of dementia by exerting positive effects on oxidative stress, inflammation, and vascular abnormalities.[10] It has been demonstrated that it offers more potent benefits in reducing the risk of Alzheimer's disease by regulating immunity and cholesterol metabolism in individuals with high genetic predisposition.[11] Due to its richness in phytochemicals and polyphenols, it supports cardiovascular health, improves sleep quality, and has positive effects on depression and anxiety.[12] Considering the beneficial effects of the Mediterranean diet on mortality, type 2 diabetes, frailty, and physical performance, it is noted that the MIND diet offers a more specific and robust approach to cognitive health by building on these beneficial aspects.[13,14]

The main objective of the study is to assess the level of adherence to the MIND diet among healthcare workers, who are expected to serve as role models for healthy lifestyles within society, with heavy workloads, work-related stress, poor nutrition, or shift work, and to determine the factors affecting adherence, such as gender, BMI, educational status, profession, marital status, smoking status, and income level. Furthermore, as the participants are healthcare workers, it will assess their knowledge, awareness, and implementation of the MIND diet. Thereby, it will contribute to the literature, given that MIND adherence among healthcare workers in Türkiye has not been previously investigated. The data obtained will form the basis for developing evidence-based intervention programmes at the organisational and policy levels to support the cognitive health of healthcare workers.

Methods

This study is a descriptive cross-sectional study conducted between 1 and 31 July 2025. The study was conducted with healthcare workers at Fatih Sultan Mehmet Training and Research Hospital in Istanbul, Türkiye. Verbal and written consent was obtained from all healthcare workers who agreed to participate in the study.

The study population consisted of 1,200 healthcare workers employed at Fatih Sultan Mehmet Training and Research Hospital who had at least an associate degree. The minimum sample size required for the study, with a 95% confidence level and a 5% margin of error, was calculated to be 292.[15] A total of 310 healthcare workers who volunteered for the study were included through random sampling.

In order to carry out the study, ethical committee approval was obtained from the Scientific Research Ethics Committee of Ağrı İbrahim Çeçen University on 27 February 2025, numbered 64, and institutional approval was obtained from the Scientific Studies Commission of Fatih Sultan Mehmet Training and Research Hospital on 28 March 2025, numbered 2025/3.

The study data were collected using a general information questionnaire and a semi-quantitative adult food frequency questionnaire to calculate the MIND diet score.

Our study complies with the Declaration of Helsinki and Good Clinical Practice Guidelines.

General Information Questionnaire Form

This questionnaire form was prepared by researchers and asks participants for information on their age, gender, body weight (kg), height (m), educational status, occupation, marital status, smoking status, and income status. Body mass index (BMI=kg/m²) values were calculated from the body weight and height information declared by the participants and classified according to WHO criteria (<18.5 kg/m² 'Underweight', 18.5–24.9 kg/m² 'Normal', 25.0–29.9 kg/m² 'Overweight', and ≥30 kg/m² 'Obese').[16]

Adult Semi-quantitative Food Frequency Questionnaire

The adult semi-quantitative food frequency questionnaire, which includes a total of 229 foods, is the first semi-quantitative food consumption frequency questionnaire prepared for the Turkish population by Gunes et al.[17] When asking the questions in this questionnaire, the book Food and Nutrition Photo Catalogue: Measurements and Quantities was used to record the amounts and portions of the foods consumed by the participants.[18] The consumption frequency data for each food group were evaluated according to the food portion sizes listed in the Turkish Nutrition Guide (TÜBER) 2022 to determine the MIND diet compliance scores.[19]

MIND Diet Scale

The validity and reliability of the MIND diet scale developed by Morris et al.[4] for the Turkish population were established by Atabilen et al.[20] The MIND diet scale, calculated based on adult semi-quantitative food frequency questionnaire data, consists of 15 questions in total. A total score of 0–15 can be obtained from questions scored as '0', '0.5' and '1'. The fifth question on the scale, olive oil consumption, is scored as '0' and '1'. The total score is divided into tertiles (thirds); the lowest tertile is interpreted as 'low MIND compliance', the middle tertile as 'moderate MIND compliance', and the highest tertile as 'high MIND compliance'.[4] In general, butter, margarine, cheese, red meat and meat products, fast food items, and pastries are considered unhealthy in the MIND diet, while berries, vegetables, oily seeds, olive oil, whole grains, uncooked fish, legumes, and uncooked poultry are considered healthy. Additionally, moderate consumption of wine is recommended in the MIND diet.[4]

Statistical Analysis

The data obtained from the study were analysed using the SPSS for Windows 25.0 programme. The assumption of normal distribution for quantitative variables was checked using the Kolmogorov-Smirnov test. Descriptive statistics were presented as the median (25^{th}–75^{th} percentile) for quantitative variables and as the number (n) and percentage (%) for categorical variables. Relationships between categorical variables were examined using chi-square analysis. A p-value<0.05 was considered statistically significant.

Results

The participants in the study according to their demographic characteristics are presented in Table 1. The median age of healthcare workers was 37 years, with 74.5% being female and 25.5% male. The majority (49.0%) of participants had a normal BMI and a bachelor's degree (42.6%), while 24.5% were doctors and 26.2% were nurses. More than half of the participants stated that they were married (54.5%), did not smoke (67.7%), and had a middle-level income (Table 1).

The distribution of participants' food consumption according to their MIND diet component scores is presented in Table 2. It was found that 50.3% of participants consumed green leafy vegetables, an important component of the MIND diet, in the range of 2–6 portions per week, while 53.2% of participants consumed berries less than 1 portion per week. It was found that more than half of the participants (63.9%) used olive oil as their primary fat, but 52.3% consumed more than one tablespoon of butter and margarine per day. Similarly, fish, a food that increases adherence to the MIND diet, was rarely consumed by 46.8% of participants, while 70.6% reported consuming less than one glass of wine per day or none at all (Table 2).

The comparison of the demographic characteristics of the participants in the study according to their MIND diet scores is presented in Table 3. MIND diet scores did not differ according to gender, BMI, educational status, occupation, and

Table 1. Distribution According to Participants' Demographic Characteristics (n=310)

	n	%
Age (Median [25.-75.percentile])	37.0 (27.0 – 48.0)	
Gender		
Female	231	74.5
Male	79	25.5
BMI		
Underweight	7	2.3
Normal	152	49.0
Overweight	94	30.3
Obese	57	18.4
Educational Status		
Associate Degree	79	25.5
Bachelor's Degree	132	42.6
Master's Degree	87	28.1
Doctorate	12	3.8
Profession		
Doctor	76	24.5
Nurse	81	26.2
Midwife	10	3.2
Technician	50	16.1
Other	93	30.0
Marital status		
Married	169	54.5
Single	141	45.5
Smoking Status		
Non-smokers	210	67.7
Smokers	100	32.3
Income Status		
Avarage	198	63.9
Good	112	36.1
MIND Total (Median (25.-75.percentile))	7.5 (6.0 – 8.5)	

Descriptive statistics median (25.-75.percentile) or frequency (n) and percentage (%). BMI: Body mass index, MIND: Mediterranean DASH Intervention for Neurodegenerative Delay.

marital status (p>0.05); however, there was a statistically significant relationship between income status and MIND compliance (p=0.025). Accordingly, individuals with high MIND diet compliance rated their income status as good at a higher rate (Table 3).

Discussion

In this study conducted with 310 healthcare workers in Türkiye (74.5% women, 25.5% men), the average age was 37.0 (27.0–48.0) years, and the average MIND diet score was calculated as 7.5 (6.0–8.5) points. MIND diet scores did not differ according to gender, BMI, educational status, occupation, or marital status; however, there was a statistically significant relationship between income status and MIND compliance. Accordingly, individuals with high MIND diet compliance rated their income status as good at a higher rate. The high cost of certain foods (berry fruits, olive oil, nuts) that contribute to a high MIND diet score may have influenced the high scores among individuals with higher incomes.

Similarly, in a study examining the validity and reliability of the MIND diet, involving 150 volunteers aged 18 and over in Türkiye (80.7% women, 19.3% men) with an average age of 27.4±8.49 years, the average MIND diet score was found to be 7.17±2.13 points, similar to this study.[20] In the MIND diet scoring system, which ranges from a minimum of 0 to a maximum of 15, it can be said that the average score of the participants indicates moderate adherence to the MIND diet.

In both studies, those with a normal BMI constituted the highest proportion, with this proportion being 49% in the study involving healthcare workers and 70.7% in the study by Atabilen and colleagues.[20] Again, in the study by Atabilen et al.,[20] 72.7% of individuals were single, while in the study conducted with healthcare workers, the proportion of married individuals (54.5%) was higher. This may be due to the higher average age of healthcare workers. While 67.7% of healthcare workers did not smoke, this rate was 86% in the study by Atabilen and colleagues.

Again, in both studies, the middle income level constituted the highest percentage of income status, with this rate being 63.9% among healthcare workers and 49.3% in the other study. Similarly, in a study evaluating the effect of the MIND diet on metabolic health conducted in the United States with 163 volunteers aged 25–45, the average MIND diet compliance of individuals was found to be 7.1±2.0 points, similar to this study.[21] In another study conducted in the United States with 207 individuals (116 women) with an average age of 34.1±6.0 and BMI values between 18.5 and 40 kg/m², MIND diet adherence was recorded as 7.3±1.9 points.[22]

In a study conducted in Iran with 7,165 individuals (aged 20–70) examining the relationship between the MIND diet and psychological disorders and psychological stress, the MIND diet score was found to be 7.56 points on average. It was found that those in the highest quartile of the MIND diet also had a high BMI. While differences in MIND diet scores

Table 2. Distribution of Participants' Food Consumption According to Their MIND Diet Component Scores (n=310)

	0		0.5		1	
MIND Diet Components	n	%	n	%	n	%
Green leafy vegetables	113	36.5	156	50.3	41	13.2
Other vegetables	191	61.6	91	29.4	28	9
Berries	165	53.2	93	30	52	18.8
Nuts	77	24.8	196	63.2	37	12
Olive oil	112	36.1	-	-	198	63.9
Butter, margarine	51	16.4	97	31.3	162	52.3
Cheese	108	34.8	181	58.4	21	6.8
Whole grains	107	34.5	142	45.8	61	19.7
Fish	145	46.8	107	34.5	58	18.7
Legumes	102	32.9	191	61.6	17	5.5
Poultry	63	20.3	98	31.6	149	48.1
Red meat and meat product	23	7.4	106	34.2	181	58.4
Fast food / Fried foods	30	9.7	104	33.5	176	56.8
Pastries and sweets	18	5.8	72	23.2	220	71
Wine	219	70.6	78	25.2	13	4.2

Descriptive statistics are presented as frequency (n) and percentage (%). MIND: Mediterranean DASH Intervention for Neurodegenerative Delay.

Table 3. Comparison of Participants' Demographic Characteristics According to MIND Diet Scores (n=310)

	MIND Diet Compliance			
	Low	Medium	High	p
Gender				
Female	43 (76.8)	138 (73.4)	50 (75.8)	0.849
Male	13 (23.2)	50 (26.6)	16 (24.2)	
BMI				
Underweight+Normal	31 (55.3)	91 (48.4)	37 (56.1)	0.664
Overweight	16 (28.6)	58 (30.9)	20 (30.3)	
Obese	9 (16.1)	39 (20.7)	9 (13.6)	
Educational Status				
Associate Degree	16 (28.6)	46 (24.5)	17 (25.8)	0.474
Bachelor's Degree	26 (46.4)	83 (44.1)	23 (34.8)	
Master's Degree+Doctorate	14 (25.0)	59 (31.4)	26 (39.4)	
Profession				
Doctor	11 (19.6)	47 (25.0)	18 (27.3)	0.883
Nurse+Midwife	18 (32.1)	52 (27.7)	21 (31.8)	
Technician	10 (17.9)	29 (15.4)	11 (16.7)	
Other	17 (30.4)	60 (31.9)	16 (24.2)	
Marital Status				
Married	29 (51.8)	102 (54.3)	38 (57.6)	0.809
Single	27 (48.2)	86 (45.7)	28 (42.4)	
Smoking Status				
Non-smokers	34 (60.7)	135 (71.8)	41 (62.1)	0.162
Smokers	22 (39.3)	53 (28.2)	25 (37.9)	
Income Status				
Avarage	36 (64.3)[a,b]	129 (68.6)[b]	33 (50.0)[a]	0.025
Good	20 (35.7)[a,b]	59 (31.4)[b]	33 (50.0)[a]	

Similar letters appearing in the same row statistically indicate similarity, while different letters indicate dissimilarity. Descriptive statistics are indicated as the median (25th–75th percentile). BMI: Body mass index, MIND: Mediterranean DASH Intervention for Neurodegenerative Delay.

were found in terms of age and education level,[23] in this study no relationship was found between BMI, age, education level, and MIND diet adherence.

Only individuals with a high income level were found to have a high adherence to the MIND diet. In another study examining the relationship between the MIND diet and cognitive function, conducted with 1,502 individuals aged 45–75, 70% of whom were women, the average MIND diet score was found to be 7.39±1.5 points.[24] Similarly, in this study, the proportion of women was 74.5%, and the MIND score was similarly calculated as 7.5 (6.0–8.5), with no significant difference observed between women and men.

In the study conducted with Puerto Rican individuals, women's adherence to the MIND diet was found to be higher than men's. In both studies, no difference was found between BMIs and the level of adherence to the MIND diet. Among Puerto Ricans, a higher number of smokers were found in the lower MIND diet quintile. Similarly, individuals with an education level of Year 8 or below, a poverty rate below 120%, or lower employment complexity tended to have lower MIND diet scores.[24] This study did not find any differences in MIND diet adherence between education levels. This may be because the lowest level of education among participants was associate degree. However, it was found that those with higher income levels showed higher adherence.

When examining the average MIND diet scores, it was expected that healthcare professionals would have higher scores due to their profession; however, studies involving non-healthcare professionals also showed average scores close to those in this study. Among 16,058 women with an average age of 74.3±2.3 years who participated in the Nurses' Health Study, the average MIND score was calculated as 6.4 (2.6–11.0) points. Women who showed greater adherence to MIND in the long term were found to be more likely to have a lower BMI, be more physically active, and be more highly educated. They were also less likely to smoke and report a history of depression. The fact that the study was conducted between 1984 and 1998, a period when the relationship between these dietary components and cognitive function and cognitive decline was not yet known, may have contributed to the low scores, despite the participants being healthcare professionals. Contrary to our study, however, there was no significant difference in the association between high income and high MIND diet adherence.[1]

It has been determined that adherence to the diet is not high among healthcare professionals in our country, despite the passage of a long period of time. In another Netherlands-based study involving women examining the relationship between high MIND diet scores and low dementia risk, the MIND diet score was 5.9±1.3 points between 1989 and 1993, while in the same population, this score was calculated as 7.4±1.6 points between 2009 and 2012. A significant relationship was found between an increase in the MIND diet score and a decrease in the risk of dementia.[11]

When examining the MIND diet scores of 85 children, 44 of whom were girls, with an age range of 9.6±1.9, the average MIND diet score in the study was found to be 4.5±1.8. The absence of wine consumption in children, their preference for their own food choices, their general lack of preference for vegetables, and their generally low fish consumption may contribute to low MIND diet scores.[25]

The main factors contributing to this low score may be Türkiye's dietary culture, seasonal access to fruit and vegetables, and socio-economic differences. Despite being a peninsula, it is a fact that fish consumption in Türkiye is low. In this diet, consuming non-fried fish more than once a week results in a high score. Both economic factors and the low status of fish in our culture may be reasons for the low score. In this study, 46.8% of participants stated that they rarely consumed non-fried fish. Similarly, wine has not taken root in our culture. As seen in the results, only 4.2% of participants achieved a high score by consuming a glass of wine every day. It is known that berry fruits, which are seasonal and expensive compared to other fruits, are not widely available or purchased in Türkiye. In this study, 53.2% of participants stated that they rarely consume berry fruits.

Another reason for the low average MIND diet score may be the low awareness of this diet and the lack of knowledge about nutrition among participants, even though they are healthcare professionals. This is because, even though awareness of the diet is low, the health benefits of the nutrients it contains have been known for years. Additionally, due to work conditions, healthcare professionals eat one or two meals at the hospital and, because these meals are served in a state hospital rather than a private one, the variety of the lunch menu is limited and lacks foods that increase the MIND diet score (such as fish, berries, nuts), and the meals are not cooked with olive oil. These may be other reasons for the low score.

The study is significant as it is the first descriptive cross-sectional study conducted with healthcare workers in Türkiye. Healthcare workers are a group expected to provide information to the public about healthy lifestyles and to serve as role models. Identifying low scores among this group provides a critical starting point not only for their own health but also for the consistency and effectiveness of public health messages.

This study has some important limitations that may affect the generalisability and internal validity of the findings. Firstly, the fact that the research was conducted in a single-centre setting limits the generalisability of the results to other healthcare institutions or healthcare workers in different geographical regions. A second and important limitation is that participants reported their income levels based on self-declaration. This situation may lead to social desirability bias and potential misreporting, reducing the measurement reliability of the true impact of socioeconomic inequalities on dietary habits. Therefore, it is recommended that future studies be designed to be multi-centre to ensure broader representativeness and that income data be collected using validated methods.

Conclusion

This study observed that, despite being healthcare professionals, participants did not adhere to the MIND diet to a high degree. The low results of the MIND diet screening conducted among healthcare workers indicate a significant deficiency in adherence to brain-protective dietary habits. This finding is not merely an individual health issue but also a consequence of institutional and structural barriers such as demanding working conditions, socio-economic inequalities, and limited dietary options in hospital settings.

Therefore, a multidimensional approach should be adopted for sustainable improvement. Hospital management and policymakers can address this issue by offering short, practical nutrition education programmes, adapting canteen menus to MIND diet standards, and providing vouchers/discounts that promote access to healthy food, particularly for low-income workers. Nutrition education in hospitals can be organised in the form of 10–15 minute online (e-learning) or on-site short seminars, tailored to the busy schedules of staff. Volunteers who are motivated about healthy eating (doctors, nurses, dieticians, etc.) can be identified as peer educators, and training can be organised in this way. These individuals can serve as role models to raise awareness within their own units.

Healthy alternatives can be added to the canteen menu. Options that comply with MIND diet principles (such as whole grain salads) can be offered in hospital canteens and cafeterias. In addition to the food provided during shifts, alternatives such as nuts can be added for staff working night shifts and long hours. According to the results, it was found that those with a higher income level showed greater adherence when comparing income levels. Those with a good income have a higher purchasing power and therefore better access to foods suitable for the MIND diet.

As a state policy, national incentives could be implemented, such as reducing tax rates on key healthy foods highlighted in the MIND diet (olive oil, fresh vegetables, fish). Protecting the cognitive resilience and well-being of a profession that sacrifices its own health should be a primary priority for patient safety and the provision of quality healthcare services.

Disclosures

Ethics Committee Approval: The study was approved by Ağrı İbrahim Çeçen University Ethics Committee (No: 64, Date: 27.02.2025).

Informed Consent: Verbal and written consent was obtained from all healthcare workers who agreed to participate in the study.

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