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Research Article

Dietary Habits, Physical Activity and the Mental Well-Being of Turkish Adults in COVID-19 Pandemic Process: A Cross Sectional Study

Senay CATAK[1*], Nursel SAHIN[2] and Gamze AKBULUT[3]

[1]Research Assistant, Department of Nutrition and Dietetic, Aydin Adnan Menderes University, Aydin, Turkey

[2]Research Assistant, Department of Nutrition and Dietetic, Bandirma Onyedi Eylul University, Balikesir, Turkey

[3]Professor Doctor, Department of Nutrition and Dietetic, Gazi University, Ankara, Turkey

***Corresponding authors:** Senay CATAK, Department of Nutrition and Dietetic, Aydin Adnan Menderes University, Aydin, 09100, Turkey, Tel: +905398148252, E-mail: senay.ozkorkmaz@adu.edu.tr

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Abstract

Background: Health is defined as a state of complete physical, mental and social well-being. Mental health is essential for maintaining good health and can be affected by diet and lifestyle.

Objective: The purpose of this study is to assess the dietary habits and physical activity that affect mental well-being in Turkish adults in COVID-19 pandemic process.

Design: This cross-sectional study used a self-administrated semi-quantified food frequency questionnaire, Mediterranean Diet Adherence Scale (MEDAS), and Short Warwick Edinburgh Mental Well-Being Scale (SWEMWBS).

Participants/setting: Data were collected from November 2020-February 2021 via online questionnaire from Turkish adults. A total of 918 individuals (143 men and 775 women) were included in the study.

Results: There was a significant relationship between the MEDAS and SWEMBS scores by gender. SWEMBS score showed a direct significant relationship with the consumption of olive oil as the main culinary fat, consumption of vegetables, legumes, and fish/shellfish and eicosapentaenoic acid (EPA) intake increased significantly as the SWEMBS score increased ($p < 0.05$).

Conclusions: Maintaining a certain level of physical activity along with healthier eating habits will provide a healthier future by improving both physical and mental health.

Keywords

Mediterranean diet, Mental health, Vegetables, COVID-19, Fish consumption

Introduction

In the twenty-first century, climate change, urban growth, cultural and technological changes, as well as industrialization and over-processing of food, have become growing global problems for public health and mental health [1]. For this reason, it is very important for protecting individuals' mental health, increasing the quality of life, coping with mental illnesses, reducing medical costs and other social expenses, and increasing national competitiveness [2].

As staying mentally healthy is more significant than treating or preventing mental illness, "mental well-being" is considered an important concept. Mental well-being is a core component of optimal health and refers to a person's psychological functioning, life satisfaction, and the ability to develop and maintain mutually beneficial relationships [3]. Therefore, mental health is affected by many factors. These factors include genetic factors, stress, diet, physical inactivity, medications, and other environmental factors [4-6].

It is accepted that a balanced diet is a key factor for an individual's health condition not only physically

but also in terms of mental health [7]. A balanced and adequately planned diet is more likely to provide nutrients that increase resistance to the pathogenesis of mental illness. Because a significant part of total energy and nutrient intake is used by the brain which depends on amino acids, fats, vitamins, and minerals or trace elements (including intracellular and intercellular transmission) in both structure and function [1,8]. In order to sustain a balanced diet in maintaining mental health, it is desirable to return to the traditional diet, which includes the consumption of foods such as vegetables, fruits, fish/shellfish, whole grains, lean meat, nuts, and legumes, avoiding processed foods (trans fats and refined carbohydrates and sugars) [9]. Therefore, there is increasing evidence that certain dietary models, including the Mediterranean diet, which is a healthy and sustainable diet, can be applied as effective strategies to prevent mental illness [10].

Physical activity (PA) is an important modifiable lifestyle factors that has positive effects on physical health throughout life [11]. It is also recognized as an important risk factor for the prevention and management of mental illnesses, especially depression and anxiety [12]. Although physical activity is widely encouraged for its positive effects on mental health, the evidence base is more related to physical activity and negative mental health [13]. Physical activity has a positive effect on mental health through mechanisms such as stimulating neuroplastic processes, reducing inflammation, and increasing resistance to physiological stress [14]. Even low doses of physical activity are associated with a lower risk of mental illness [15]. In addition, it is stated that increasing physical activity along with the consumption of fruits and vegetables will play an important role in improving mental health [16].

In addition, it is known that a healthy and balanced diet is a part of individual risk management in pandemic processes [17]. Many bioactive nutrient components, along with most macro and micronutrients, act as immune modulators against viral infections [18]. Especially the Mediterranean Diet, with its nutrients and nutritional components, can have a protective effect in these processes. Research on the ongoing COVID-19 outbreak reports changes in individuals' dietary attitudes and a trend towards a healthy diet [19,20].

The purpose of this study is to determine the dietary habits and physical activity that affect mental well-being in adult individuals in COVID-19 pandemic process.

Materials and Methods

This study was conducted with an online questionnaire between November 2020 and February 2021 in order to assess dietary habits and physical activity that affect mental well-being in adults. Within the scope of the survey, 1098 individuals attended to the study; but the data of 918 individuals who met the study criteria were analyzed. The study was conducted in accordance with the Declaration of Helsinki and the study procedures were approved by the Institutional Review Board at the Aydin Adnan Menderes University Faculty of Health Science Non-Invasive Ethics Committee (Number: 2020/050).

Research design

In this cross-sectional and descriptive study, data collected through an online questionnaire consisting of questions about nutritional behaviours, lifestyle habits, and mental health status. The questionnaire was shared via social media or e-mail that can be accessed from any device with an internet connection by creating a link. A total of 918 people (143 men and 775 women) were included in the study.

Data collection

Data collection was done through a structured questionnaire created on Google Forms and individuals were informed that all data would be used for research purposes only. Individuals' responses are kept confidential according to Google's privacy policy. The questionnaire consists of a self-administrated semi-quantified food frequency questionnaire with 54 foods and socio-demographic characteristics, anthropometric measurements (body weight (kg), height (m)), Mediterranean Diet Adherence Scale (MEDAS), and Short Warwick Edinburgh Mental Well-Being Scale (SWEMWBS) to evaluate adherence to Mediterranean Diet (MD) and its effects on mental well-being. The energy intake (EI) and nutrients were calculated using a computer-assisted nutrition program developed for Turkey Nutrition Information System (BeBiS 7.2). Body Mass Index (BMI) was calculated using the body weight (kg) and height (m) of the individuals (kg/m^2). World Health Organization's (WHO) classification was used in the assessment of BMI [21]. The normal range is 18.5-24.9 kg/m^2, overweight is 25-29.9 kg/m^2, and obesity is ≥ 30 kg/m^2. In addition, to evaluate the adherence of individuals to the MD, BMI < 25 kg/m^2 (underweight/normal body weight) and BMI ≥ 25 kg/m^2 (overweight/obese) were classified. The total weekly activity was obtained from the sum of high, moderate, light (walking) physical activity and resting and was expressed in MET-min/week. Total physical activity was classified as below 600 MET-min/week as low, 600-3000 MET-min/week as moderate, and over 3000 MET-min/week as high activity [22].

The MEDAS was found by Schröder, et al. (2011) to be a valid tool for the rapid estimation of adherence to the MD. The scale consisting of 14 questions was

adapted to Turkish by Pehlivanoğlu (2020) and its validity and reliability have been ensured. The scale includes the type of essential oil used by individuals in meals, the amount of olive oil consumed daily, fruit and vegetable portions, margarine-butter and red meat consumption, weekly consumption of wine, legumes, shellfish/fish, snacks, nuts, pie, tomato sauce with olive oil and whether white meat is preferred more than red meat. According to the amount of consumption, 1 or 0 points are taken for each question asked and the total score is calculated. A total score of 7 and above indicates that the individual has an acceptable level of adherence to the MD, while a total score of 9 and above indicates that the individual has strict adherence to the MD. In this study, the MEDAS score of the individuals, below 7 points, was evaluated as low adherence to the MD, 7-8 points as moderate adherence to the MD, and 9 points and above as high adherence to the MD [23,24].

The SWEMWBS consists of a 5-point Likert type (1 = Never 5 = Always), 7-item scale consisting of positive expressions, whose validity and reliability in Turkish was made by Demirtaş and Baytemir (2019). It has been developed to measure the mental well-being of individuals. Seven items on the scale are associated with functionality rather than emotions. The scoring of the scale is between 7 and 35. Higher scores on the scale indicate higher positive mental well-being. In practice, individuals are asked to consider their experiences in the last two weeks [25,26].

Statistical evaluation of data

The data obtained from the research were evaluated

Table 1: Demographic, dietary, and lifestyle characteristics of individuals according to gender.

Characteristics	Men (n = 143)	Women (n = 775)	Total (n = 918)	p*
Age (year)	27.8 ± 9.97	24.7 ± 6.27	25.2 ± 7.05	< 0.001*
BMI (kg/m^2)	25.5 ± 6.99	22.1 ± 6.63	22.6 ± 6.80	< 0.001*
BMI classification				
- *Underweight*	3 (2.1%)	118 (15.2%)	121 (13.2%)	< 0.001*
- *Normal weight*	86 (60.1%)	523 (67.5%)	609 (66.3%)	
- *Overweight*	42 (29.4%)	99 (12.8%)	141 (15.4%)	
- *Obese*	12 (8.4%)	35 (4.5%)	47 (5.1%)	
Education Status				
- *Primary school*	4 (2.8%)	10 (1.2%)	14 (1.5%)	0.034*
- *High school*	11 (7.7%)	31 (4.0%)	41 (4.6%)	
- *Graduate*	111 (77.6%)	653 (84.3%)	764 (83.2%)	
- *Postgraduate*	17 (11.9%)	81 (10.5%)	98 (10.7%)	
Physical activity				
- *Low*	45 (31.5%)	331 (42.7%)	376 (40.9%)	0.214
- *Moderate*	85 (59.4%)	426 (55.0%)	511 (55.7%)	
- *High*	13 (9.1%)	18 (2.3%)	31 (3.4%)	
Dietary composition				
- *Energy (kcal)*	2517 ± 1484	2404 ± 1050	2422 ± 1129	0.271
- *Carbohydrates* - *(% EI)*	36.5 ± 6.00	36.3 ± 6.43	36.3 ± 6.36	0.712
- *Protein (% EI)*	15.0 ± 3.26	15.0 ± 2.80	15.0 ± 2.87	0.892
- *Fat (% EI)*	48.5 ± 6.23	48.7 ± 6.57	48.7 ± 6.51	0.653
- *Fibre (g)*	35.7 ± 20.20	34.6 ± 15.16	34.7 ± 16.05	0.418
MEDAS score	6.7 ± 2.02	7.1 ± 1.92	7.1 ± 1.94	0.013*
SWEMBS score	25.3 ± 5.25	24.4 ± 4.65	24.6 ± 4.76	0.028*

Values are expressed as means and standard deviation (M ± SD) for continuous variables or as number and percentage (n (%)) for categorical variables.

BMI: Body Mass Index; EI: Energy Intake; MEDAS: Mediterranean Diet Adherence Scale; SWEMBS: Short Warwick Edinburgh Mental Well-Being Scale.

*The t test and One-Way ANOVA test were performed to evaluate differences by gender. Significance for variables is accepted as p < 0.05.

with the SPSS 22 version statistical package program. Mean ± standart error (SE) or mean ± standart deviation (SD) for normally distributed numerical variables and number (n) and percentage (%) values were calculated in the evaluation of qualitative data. To examine the relationship between continuous and two-group variables, t-test was used for normally distributed data. Differences between groups in categorical variables were controlled by Student's t-test. One-Way ANOVA test for normally distributed data in data grouped more than two; Kruskal-Wallis test was used for non-normally distributed data. Correlations were evaluated using Pearson's correlation coefficient. Multiple linear regression models used to evaluate the relation between consumption habits and intake of food and mental well-being. Statistical significance in the analyzes was evaluated at the $p < 0.05$ and $p < 0.001$ levels.

Results

The socio-demographic and lifestyle characteristics of the individuals included in the study are shown in Table 1. A total of 918 people, 143 (15.6%) men, and 775 (84.4%) women, participated in the study. The mean age of individuals was 25.2 ± 7.05 years, and the mean BMI for women and men was 22.1 ± 6.63 kg/m^2 and 25.5 ± 6.99 kg/m^2, respectively. There was a significant difference between men and women in terms of BMI classification ($p < 0.05$). There was no statistically significant difference between women and men in terms of energy, carbohydrate, fat, protein, and fiber intake ($p > 0.05$). The mean MEDAS score was 7.1 for women and 6.7 for men. MEDAS scores of women were significantly higher than men ($p < 0.05$). The SWEMBS score was found to be 24.4 in women and 25.3 in men. SWEMBS scores of men were significantly higher than women ($p < 0.05$).

The relationship between physical activity and adherence to the MD and mental well-being is shown in Table 2. The cut-off points for increasing quartiles of SWEMBS scores were < 22 (Q1), 22-25 (Q2), 25-28 (Q3), and > 28 (Q4). It was found that as the SWEMBS score increased, the total MET score and MEDAS score also increased, statistically ($p < 0.05$).

Table 3 shows the results of the regressions with the different elements of the MEDAS questionnaire as independent variables. SWEMBS score showed a direct significant relationship with the consumption of olive oil as the main culinary fat ($\beta = 0.094$, $p < 0.01$), consumption of vegetables ($\beta = 0.074$), legumes ($\beta = 0.071$), and fish/shellfish ($\beta = 0.067$) ($p < 0.05$). It was found a significant inverse relationship with the preference for chicken/turkey/rabbit and SWEMBS score ($\beta = -0.081$, $p < 0.05$).

Energy, nutrients, and fatty acids intake and their relationship with the SWEMBS score are shown in Table 4. We found that eicosapentaenonic acid (EPA) intake increased significantly as the SWEMBS score increased ($p < 0.05$). There was no statistically significant difference between energy, nutrient, and other fatty acids intake and the SWEMBS score ($p > 0.05$).

Table 5 shows the regression model results between some independent variables and the SWEMBS score. According to the model, it has been shown that there is a positive and significant relationship between the SWEMBS score and age (B = 0.130), EPA intake (B =

Table 2: The relationship between physical activity and adherence to the MD and mental well-being.

	SWEMBS score					
	Ouartile 1 (n = 224)	**Quartile 2 (n = 209)**	**Ouartile 3 (n= 251)**	**Quartile 4 (n = 234)**	**Total (n = 918)**	**p***
Physical activity status						
- *Low*	90 (23.9%)	96 (25.5%)	113 (30.1%)	77 (20.5%)	376 (40.9%)	0.004*
- *Moderate*	129 (25.2%)	111 (21.7%)	129 (25.2%)	142 (27.8%)	511 (55.7%)	
- *High*	5 (16.1%)	2 (6.5%)	9 (29.0%)	15 (48.4%)	31 (3.4%)	
Total MET score	888 ± 54.73[a]	769 ± 50.30[a]	831 ± 54.58[a]	1151 ± 107.04[b]	912 ± 35.99	0.001*
Adherence to the MD						
- *Low*	143 (27.1%)	127 (24.1%)	138 (26.1%)	120 (22.7%)	528 (57.5%)	0.048*
- *Moderate*	33 (18.8%)	42 (23.9%)	44 (25.0%)	57 (32.4%)	176 (19.2%)	
- *High*	48 (22.4%)	40 (18.7%)	69 (32.2%)	57 (26.6%)	214 (23.3%)	
MEDAS score	6.7 ± 2.03[a]	7.1 ± 1.84[a,b]	7.2 ± 1.96[a,b]	7.3 ± 1.89[b]	7.1 ± 1.94	0.015*

Values are expressed as means and standard error (M ± SE) for continuous variables or as number and percentage (n (%)) for categorical variables.

SWEMBS: Short Warwick Edinburgh Mental Well-Being Scale; MET: Metabolic Equivalent of Task;MD: Mediterranean Diet;MEDAS: Mediterranean Diet Adherence Scale.

*One-Way ANOVA or Kruskal Wallis test, $p < 0.05$; [a,b]For groups of different letters $p < 0.05$; for groups of the same letters $p > 0.05$.

Table 3: Multiple linear regression models used to evaluate the relation between consumption habits and intake of food and mental well-being.

Variables	SWEMBS score		
	B	SE	β
Olive oil as the main culinary fat	1.048**	0.402	0.094
Olive oil consumption	0.354	0.350	0.035
Vegetable consumption	0.723*	0.327	0.074
Fruit consumption	0.182	0.358	0.017
Low red meat/hamburger/meat products consumption	-0.273	0.432	-0.022
Low butter/margarin/cream consumption	0.449	0.400	0.038
Low sweet/carbonated beverages consumption	-0.063	0.411	-0.005
Wine consumption	0.545	1.425	0.012
Legumes consumption	0.676*	0.317	0.071
Fish/shellfish consumption	1.115*	0.552	0.067
Low commercial sweets/pastries consumption	0.012	0.365	0.001
Nuts consumption	0.396	0.349	0.037
Preference for chicken/turket/rabbit	-0.799*	0.327	-0.081
Sofrito seasoning consumption	-0.071	0.343	-0.007

B: non-standardized coefficient; SE: standart error; β: standardized coefficient. *p < 0.05; **p < 0.01.

Sofrito is a traditional sauce made with tomato and onion, leek, or garlic and slow-cooked with olive oil.

Table 4: The evaluation of the relation between energy, macronutrients, dietary fibre intake and mental well being.

Variables	SWEMBS score					
	Quartile 1 (n = 224)	Quartile 2 (n = 209)	Quartile 3 (n = 251)	Quartile 4 (n = 234)	Total (n = 918)	p*
Energy (kcal)	2448 ± 71.56	2317 ± 58.57	2421 ± 74.68	2493 ± 86.75	2422 ± 37.26	0.415
Carbohydrates (%)	36.9 ± 0.40	35.6 ± 0.50	36.2 ± 0.40	36.5 ± 0.39	36.3 ± 0.21	0.155
Protein (%)	14.7 ± 0.17	15.3 ± 0.20	14.8 ± 0.17	15.2 ± 0.21	15.0 ± 0.10	0.082
Fat (%)	48.3 ± 0.40	49.1 ± 0.54	49.1 ± 0.40	48.3 ± 0.39	48.7 ± 0.22	0.345
Dietary fibre (g/d)	35.8 ± 1.03	33.7 ± 0.87	33.9 ± 0.99	35.6 ± 1.27	34.7 ± 0.53	0.359
Fatty acids (g/d)						
Total PUFA	28.1 ± 1.00	27.3 ± 1.08	28.3 ± 1.03	29.0 ± 1.19	28.2 ± 0.54	0.734
Total n-6 PUFA	24.3 ± 0.86	23.6 ± 0.92	24.5 ± 0.89	25.2 ± 1.04	24.4 ± 0.47	0.714
Linoleic acid	24.1 ± 0.85	23.4 ± 0.92	24.3 ± 0.88	25.0 ± 1.03	24.2 ± 0.46	0.720
Arachidonic acid	0.1 ± 0.01	0.2 ± 0.01	0.2 ± 0.01	0.2 ± 0.01	0.2 ± 0.01	0.406
Total n-3 PUFA	3.7 ± 0.15	3.7 ± 0.16	3.8 ± 0.15	3.9 ± 0.16	3.8 ± 0.08	0.848
α-linolenic acid	3.2 ± 0.12	3.2 ± 0.15	3.3 ± 0.13	3.3 ± 0.14	3.3 ± 0.07	0.945
EPA	0.1 ± 0.00	0.1 ± 0.00	0.1 ± 0.00	0.1 ± 0.01	0.1 ± 0.00	0.045*
DPA	0.1 ± 0.01	0.1 ± 0.00	0.1 ± 0.00	0.1 ± 0.01	0.1 ± 0.00	0.112
DHA	0.2 ± 0.01	0.2 ± 0.01	0.2 ± 0.01	0.2 ± 0.01	0.2 ± 0.01	0.260

Values are expressed as means and standard error (M ± SE) for continuous variables or as number and percentage (n (%)) for categorical variables.

PUFA: Polyunsaturated Fatty Acid; EPA: Eicosapentaenonic Acid; DPA: Docosapentaenoic Acid; DHA: Docosahexaenoic Acid; N: Omega.

*One Way ANOVA, p < 0.05.

Table 5: Factors associated with SWEMBS score by multiple linear regression analysis.

Variables	SWEMBS score		
	B	SE	β
Age (year)	0.130*	0.022	0.192
BMI (kg/m^2)	0.044	0.023	0.062
Energy (kcal)	-8.449	0.000	-0.020
EPA (g/d)	5.405*	2.356	0.088
Total MET score	0.001*	0.000	0.118
MEDAS score	0.280*	0.078	0.114

B: non-standardized coefficient; SE:standart error; β: standardized coefficient. *p < 0.05.

SWEMBS: Short Warwick Edinburgh Mental Well-Being Scale; BMI: Body Mass Index; EPA: Eicosapentaenonic Acid; MET: Metabolic Equivalent of Task; MEDAS: Mediterranean Diet Adherence Scale.

5.405), total MET score (B = 0.001), and total MEDAS score (B = 0.280) (p < 0.05).

Discussion

While the prevalence of mental illness continues to increase day by day, variable lifestyle behaviours that have a positive impact on mental health are issues that should be emphasized. Therefore we evaluated the dietary habits and physical activity associated with the mental well-being of Turkish adults in COVID-19 pandemic process with this study.

Physical activity is a factor that promotes health and well-being [27]. At the same time, evidence has consistently shown that physical activity is positively associated with increased mental well-being [28,29]. In a study examining the relationship between physical activity and positive mental health, higher PA levels were generally associated with higher positive mental health, and inactivity was associated with lower positive mental health [30]. Similarly, another study found that physically inactive individuals had significantly greater increases in mental well-being with PA intervention, and there was a strong and positive correlation between increased physical activity and mental well-being [31]. In a study examining the physical activity level and quality of life of university students in Turkey during the COVID-19 pandemic, it was found that 48.5% of the participants had low physical activity levels and low physical activity levels adversely affected mental health [32]. In this study, most of the individuals (55.7%) were at moderate physical activity, while 40.9% were at low physical activity levels. As the total MET score of individuals increased, the SWEMBS score increased significantly (p < 0.05). In other words, mental well-being was found to be higher in individuals with high levels of physical activity. Physical activity can also be an effective therapy method in combating mental and physical problems that may be caused by COVID-19.

Antioxidant defense systems involved in mental illness work with the support of nutritional cofactors and phytochemicals. Neurotrophic factors that contribute to neuronal plasticity and repair mechanisms throughout life are also affected by dietary factors [33]. Therefore, diet and dietary bioactive components are considered modifiable risk factors affecting the etiology of mental illnesses [34]. Current evidence suggests that healthy diet models that meet energy and nutrient needs can help prevent and treat depression and anxiety [35]. For example, healthy eating habits with antioxidant and anti-inflammatory effects, such as the Mediterranean and Norwegian diets characterized by high fruit and vegetable intake, and a consumption of whole grains, fish, and meat, have been associated with reduced risk of depressive symptoms [36,37]. In a cohort of Italian adults, a significant linear relationship trend was found between general quality of life and adherence to the Mediterranean diet score. It is stated that antioxidant micronutrients and photochemical, such as polyphenols, which are high in the Mediterranean diet, show potential beneficial effects on individuals' physical and mental well-being, providing overall better quality of life [38]. These molecules also may work synergistically to prevent and protect inflammatory manifestations and related complications associated with thrombotic and reactive oxygen species (ROS). Therefore, Mediterranean diet may be beneficial for non-communicable diseases, it may also be beneficial for infectious diseases such as COVID-19 as it affects immune health [39]. In another study, physical fitness was found that positively correlated with the Mediterranean Diet, and adherence to the MD was associated with different mental health factors [40]. In this study, the mean MEDAS score of the individuals was found to be 7.1 ± 1.94, and they generally had a moderate adherence to MD. As individuals' adherence to MD increased, their SWEMBS scores also increased (p < 0.05). High adherence to the Mediterranean diet can contribute positively to the COVID-19 pandemic process and mental health, due to its antioxidant, anti-inflammatory and antithrombotic effects.

Some studies showed that increased consumption of fruits, nuts, vegetables, legumes, fish, and whole grains was closely linked to well-being and a lower risk of depression [38,41-45]. We observed that regarding SWEMBS score, a direct significant relationship was found with the use of olive oil as the main culinary fat and consumption of vegetables, legumes, and fish/shellfish with greater amounts ($p < 0.05$). This effect may be associated with the intake of certain vitamins (eg, vitamin B and folate, and vitamin E) and minerals (eg. magnesium or zinc) as well as n-3 fatty acids or the n-3/n-6 ratio. Because these nutrients have antioxidant properties and roles in the synthesis of some hormones and neurotransmitters which have antidepressant properties.

An adequate intake of polyunsaturated fatty acids (PUFAs) critically affects brain function. PUFAs found in the human body can be divided into two main groups as n-6 and n-3 PUFAs, which are derived from two essential fatty acids, linoleic acid (LA, 18:2 n-6) and α-linolenic acid (ALA, 18:3 n-3), respectively. In humans, nutritional deficiencies of n-3 fatty acids are associated with an increased risk of developing various psychiatric disorders. In particular, EPA and DHA have been associated with maintaining mental health, and their shortcomings have been involved in the pathophysiology of mental disorders [46]. In a meta-analysis of clinical studies examining the effects of EPA on depression, it was shown that EPA supplementation was highly effective on primary depression [47]. And also EPA supplementation has been shown to significantly improve depression scale scores compared to placebo in middle-aged women with episodes of psychological distress or major depression [48]. In this study, similar results have been shown. It was found that the intake of higher amounts of EPA was associated with better mental health status ($p < 0.05$). This may be due to EPA's effects on anti-inflammatory and brain biochemistry. Lack of n-3 fatty acids in the diet can change the composition of the cell membrane. Each cell needs a healthy, functional bilayer layer of lipids to facilitate the physiological response and maintain fluidity. However, the current diets generally contain more levels of n-6 fatty acids than n-3. The main cause of death in patients infected with severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is the failure of several organs, which is the result of an overload of the immune system that causes cytokine storms. Omega-3 fatty acids are known to produce fewer pro-inflammatory cytokines, so higher intake of n-3 fatty acids from foods or supplements can reduce virus penetration, improve immune function, and reduce disease severity among those diagnosed with COVID-19 [49]. Increasing EPA consumption can be an effective treatment for both mental health and prevention or treatment of COVID-19.

Stressful situations and bad living and eating habits are often associated with poor mental health. In a study examining the relationship between health behaviour changes and negative mood during the COVID-19 quarantine, being less physically active and eating a more unhealthy diet were associated with more negative mood. In our study, it was found that healthier eating habits were associated with better mental health scores [50]. In the COVID-19 pandemic, the quarantine process and illness anxiety can negatively affect mental health. A healthy diet can help prevent and heal the mental damage that the COVID-19 pandemic can cause.

The main limitation of the present study is represented by a self-reported questionnaire, which may lead to the actual misreporting of data. And also, data were collected online in a few months in this survey, so the findings can not be generalized for all age groups and for the population of Turkey is predominantly young adult population.

Conclusion

It was found that there was a significant relationship between the MEDAS and SWEMBS scores by gender. SWEMBS score showed a direct significant relationship with the consumption of olive oil as the main culinary fat, consumption of vegetables, legumes, and fish/shellfish. It was found that EPA intake increased significantly as the SWEMBS score increased. In conclusion, with this study, we present a positive relationship between high adherence to the Mediterranean diet ingredients and high physical activity and mental health. The recommendation of adherence to MD (and monitoring it) can provide an approach to improve the assessment of effective experience and quality of life the population in pandemic process, which will bring benefits beyond well-being. In addition, maintaining a certain level of physical activity along with healthier eating habits will provide a healthier future by improving both physical and mental health.

Author Contributions

SC's contributions for this manuscript are concept, materials, data collection, analysis and interpretation, literature search, writing manuscript and critical review. NS's contributions for this manuscript are concept, materials, data collection, analysis and interpretation, literature search, writing manuscript and critical review. GA's contributions for this manuscript are concept, design, supervision, analysis and interpretation and critical review.

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Declaration of Competing Interest

The authors have no conflicts of interest to declare.

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