

T.C.
YEDİTEPE UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF NUTRITION AND DIETETICS

**KNOWLEDGE LEVEL AND USE OF FOLIC ACID
AND COMPLIANCE WITH THE
MEDITERRANEAN DIET AMONG WOMEN OF
CHILDBEARING AGE**

MASTER THESIS

YASMIN MENGÜLLÜOĞLU

Istanbul-2024

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APPROVAL

This thesis has been deemed by the jury in accordance with the relevant articles of Yeditepe University Graduate Education and Examinations Regulation and has been approved by Administrative Board of Institute with decision dated and numbered

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DECLARATION

I hereby declare that this thesis is my work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material accepted for the award of any other degree except where due acknowledgment has been made in the text.

Yasmin MENGÜLLÜOĞLU

27 / 12/ 2024



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TABLE OF CONTENTS

THESIS APPROVAL FORM	ii
DECLARATION	iii
ACKNOWLEDGEMENTS.....	iv
TABLE OF CONTENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF SYMBOLS AND ABBREVIATION	x
ABSTRACT.....	xi
ÖZET	xii
1. INTRODUCTION	1
2. LITERATURE REVIEW.....	2
2.1. Folic Acid.....	2
2.1.1. Definition.....	2
2.1.2. Chemical Structure of Folic Acid.....	2
2.1.3. The Function of Folic Acid in the Human Body.....	3
2.1.4. Folic Acid Food Sources.....	3
2.1.5. Recommended Dose.....	4
2.1.6. Causes of Deficiency.....	5
2.1.7. Impact of Deficiency on Health.....	7
2.1.8. Determination of Deficiency.....	9
2.2. Utilization and Awareness of Folic Acid Among Women of Reproductive Age...10	
2.2.1. Awareness of Folic Acid Among Women of Reproductive Age in Turkey and Globally.....	12
2.3. Health Policies for Folic Acid Deficiency.....	13
2.4. Mediterranean Dietary Pattern.....	15

2.4.1. Definition.....	15
2.4.2. General Attributes.....	15
2.4.3. Mediterranean Diet Nutrition and Features.....	16
2.4.4. Content of the Mediterranean Diet.....	18
2.4.5. The Impact of the Mediterranean Diet on Health.....	19
2.5. The Correlation Between the Mediterranean Diet and Folic Acid Consumption...21	
2.5.1. Impact of the Mediterranean Diet on Folic Acid Deficiency.....	21
2.5.2. The Impact of the Mediterranean Diet on Health During Gestation.....	22
2.5.3. The Importance of the Relationship Between Folic Acid and the Mediterranean Diet.....	23
2.5.4. Folic Acid Use and Health Policies to Increase Compliance with the Mediterranean Diet.....	24
3. MATERIALS AND METHODS	26
3.1. Purpose and Type of Research.....	26
3.2. Place and Time of the Research.....	26
3.3. Universe and Sample of the Research.....	26
3.4. Data Acquisition Methods.....	26
3.5. Data Collection Tools.....	26
3.6. Food Consumption Record.....	27
3.7. Food Consumption Frequency.....	27
3.8. Data Analysis Methods.....	28
3.9. Ethics Committee Approval.....	28
3.10. Limitations of the Study.....	28
4. FINDINGS	29
5. DISCUSSION.....	48
6. CONCLUSION.....	52
7. SUGGESTIONS	53

8. REFERENCES	55
9. APPENDICES	62
9.1. Questionnaire Form.....	62
9.2. Curriculum Vitae.....	72
9.3. Ethics Committee Approval Form.....	73



LIST OF TABLES

Table 2.1: Sources of Folate.....	4
Table 2.2: Recommended Dietary Allowances (RDAs) Folate.....	5
Table 4.1: Distribution of Sociodemographic Characteristics.....	29
Table 4.2: Distribution of Responses to Questions on Knowledge of Folic Acid.....	31
Table 4.3: Distribution of True-False Answers to Questions on Knowledge of Folic Acid.....	34
Table 4.4: Distribution of Food Consumption Frequencies.....	35
Table 4.5: Distribution of Mediterranean Diet Adherence Level.....	37
Table 4.6: Distribution of Folic Acid Awareness Level.....	38
Table 4.7: Relationship between Mediterranean Diet Adherence Level and Folic Acid Awareness Level.....	38
Table 4.8: Mediterranean Diet Adherence Level According to Folic Acid Use.....	39
Table 4.9: Evaluation of Folic Acid Awareness Levels According to Demographic Characteristics.....	40
Table 4.10: Evaluation of Food Preferences and Level of Adherence to the Mediterranean Diet.....	41
Table 4.11: Evaluation of Food Preferences with the Level of Adherence to the Mediterranean Diet.....	43
Table 4.12: Evaluations According to Folic Acid Usage Status.....	46
Table 4.13: Linear Regression Analysis in Examining the Factors Affecting Folic Acid Awareness Level.....	46
Table 4.14: What Percentage of Folic Acid Amount is Required?.....	47

LIST OF FIGURES

Figure 2.1: Folic Acid Chemical Structure.....	2
Figure 2.2: Mediterrian Diet Pyramid (55).....	16
Figure 4.1: Age distribution of participants.....	30
Figure 4.2: Distribution by marital status.....	30
Figure 4.3: Distribution by income level.....	31
Figure 4.4: Distribution of Mediterranean diet compliance level.....	37
Figure 4.5: Distribution of folic acid awareness level.....	38
Figure 4.6: Relationship between Mediterranean Diet Adherence Level and Folic Acid Awareness Level.....	39

LIST OF SYMBOLS AND ABBREVIATION

ACOG	American College of Obstetrician and Gynaecologists
CDC	Center for Disease Control
DFE	Dietary Folate Equivalent
EFSA	The European Food Safety Authority
G	Gram
IUGR	Intrauterine Growth Retardation
Mcq	Microgram
MEDAS	Mediterranean Diet Adherence Scale
NICE	National Institute for Health and Clinical Excellence
NTD	Neural Tube Defects
PABA	p-aminobenzoic acid
PSGO	Polish Society of Gynaecologists and Obstetricians
RCOG	Royal College of Obstetrician and Gynaecologists
SAM	S-adenosyl-methionine
SPSS	Statistical Package for the Social Sciences
TBSA	Türkiye Beslenme ve Sağlık Araştırmaları
THF	Tetrahydrofolate
TNSA	Türkiye Nüfus ve Sağlık Araştırmaları
TÜBER	Türkiye Beslenme Rehberi
WHO	World Health Organization
BBM	Büşra Beyza Mert

ABSTRACT

Mengüllüoğlu, Y. (2024) Knowledge Level and Use of Folic Acid and Compliance with the Mediterranean Diet Among Women of Childbearing Age

Yeditepe University Health Sciences Institute, Department of Nutrition and Dietetics, MSc thesis, Istanbul.

This thesis examines the correlation between folic acid awareness and adherence to the Mediterranean Diet among women aged 18–45 at BBM (BÜŞRA BEYZA MERT) Polyclinic in Istanbul. The study seeks to assess participants' understanding of folic acid, their eating patterns, and their adherence to the Mediterranean Diet. A descriptive and correlational study including 144 female participants was done. The data collection encompassed a literature-based questionnaire, a food consumption frequency assessment, a 3-day food consumption record, and the MEDAS (Mediterranean Diet Adherence Scale) scale. SPSS 26 (Statistical Package for the Social Sciences) was used to analyze the study's data. In the study data analysis, quantitative variables were shown with mean, standard deviation, median, minimum, and maximum values, while qualitative variables were shown with frequency and percentage. Results revealed that 97.9% of participants recognized folic acid, whereas 48.6% were uninformed about the required daily dosage. Merely 41.7% recognized dark green leafy vegetables as a significant source of folic acid. The average compliance score for the Mediterranean Diet was 4.70 ± 1.79 , with 63.2% of participants demonstrating low adherence. A significant positive association exists between adherence to the Mediterranean Diet and awareness of folic acid ($r=0.454$, $p<0.01$). Individuals utilizing folic acid exhibited markedly greater adherence to the Mediterranean Diet ($p<0.01$). The study emphasizes the necessity for educational activities that advocate early folic acid supplementation, preconception counseling, and compliance with folate-rich diets via nutrition regulations and public health programs.

Keywords: Folic Acid, Food Consumption Diary, Food Consumption Frequency, MEDAS Scale, Women of Reproductive Age

ÖZET

Mengüllüoğlu, Y. (2024) Doğurganlık Çağındaki Kadınlarda Folik Asit Farkındalığı ve Kullanımının Akdeniz Diyeti ile İlişkisi

Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik ABD, Yüksek Lisans Tezi, İstanbul.

Bu araştırma, İstanbul'da yer alan BBM (BÜŞRA BEYZA MERT) Polikliniği'nde 18-45 yaş arasındaki kadınlarda folik asit farkındalığı ve kullanımı ile Akdeniz Diyeti'ne uyum arasındaki ilişkiyi incelemek için yapılmıştır. Araştırmada, katılımcıların folik asit bilgi düzeyi, beslenme düzenleri ve Akdeniz Diyeti'ne uyumlarını değerlendiren tanımlayıcı ve ilişkisel bir araştırmadır. Araştırma 144 kadın katılımcı arasında gerçekleştirilmiştir. Veri toplama araçları ise konuyla alakalı literatürlerin taramasıyla hazırlanmış bir anket formu, besin tüketim sıklığı, 3 günlük bir besin tüketim kaydı ve MEDAS ölçeğini içermektedir. Araştırmadan elde edilen verilerin analizi için SPSS 26 kullanılmıştır. Araştırmada veri analizinde, nicel değişkenler ortalama, standart sapma, medyan, minimum ve maksimum değerlerle gösterilirken, nitel değişkenler frekans ve yüzde ile gösterilmiştir. Veriler incelendiğinde, katılımcıların %97,9'unun folik asidi duyduğu, %48,6'sının ise günlük alınması gereken miktar hakkında bilgi sahibi olmadığı tespit edilmiştir. Araştırmada yer alan kişilerin sadece %41,7'si koyu yeşil yapraklı sebzeleri önemli bir folik asit kaynağı olarak tanımıştır. En önemli kaynak olan dana karaciğere göre daha yüksek çıkmıştır. Akdeniz Diyeti için ortalama uyum puanı $4,70 \pm 1,79$ olup katılımcıların %63,2'sinde düşük uyum görülmüştür. Akdeniz Diyeti'ne uyum ile folik asit farkındalığı arasında anlamlı pozitif bir ilişki olduğu bulunmuştur. ($r=0,454$, $p<0,01$). Folik asit kullanan bireylerde ise Akdeniz Diyeti'ne olan uyum daha fazla olduğu görülmüştür ($p<0,01$). Bu araştırma sonucunda, prekonsepsiyonel dönemde folik asit takviyesi hakkında kişilere danışmanlık sağlanması ve beslenme düzenlemeleri ile ilgili halk sağlığı eğitim programları düzenlenmesi gerekmektedir. Böylece folik asit açısından daha zengin diyetlere uyumun önemi hakkında kişileri bilinçlendiren eğitimler verilerek folik asit tüketimi ve kullanımının arttırılması sağlanmış olur.

Anahtar Kelimeler: Folik Asit, Gıda Tüketim Günlüğü, Gıda Tüketim Sıklığı, MEDAS Ölçeği, Üreme Çağındaki Kadınlar

1. INTRODUCTION

Folate is a B vitamin essential for fundamental biological processes, including DNA synthesis, methylation, and cell division, and is crucial for human health. The consumption of folic acid, particularly during gestation, is essential for fetal growth and development. Folic acid shortage may result in significant birth malformations, including neural tube defects (NTDs); hence, the World Health Organization (WHO) advises women of reproductive age to maintain sufficient folic acid consumption. In developing countries like Turkey, awareness and utilization of folic acid are inadequate, and individuals' ignorance and dietary practices contribute to this issue (1).

Recent years have highlighted the correlation between nutritious dietary habits and micronutrient consumption. The Mediterranean diet is distinguished by its foods abundant in folate. This dietary plan promotes the consistent intake of folic acid-rich foods, including vegetables, fruits, whole grains, legumes, nuts, and olive oil. The literature indicates that folic acid consumption and awareness have risen alongside greater adherence to the Mediterranean diet. Nevertheless, research investigating this relationship in our nation is few (2).

This research was performed at BBM (BÜŞRA BEYZA MERT) Polyclinic, a private healthcare facility in Istanbul, to assess the awareness and utilization of folic acid among women of reproductive age and its correlation with the Mediterranean diet. The study investigated the influence of variables including educational attainment, pregnancy history, and demographic traits on folic acid knowledge levels, while also assessing the favorable correlation between adherence to the Mediterranean diet and awareness of folic acid.

The study's conclusions intend to serve as a framework for the formulation of educational initiatives and health policies designed to enhance persons' understanding of folic acid and their compliance with the Mediterranean diet. The study highlights the significance of increasing awareness regarding both folic acid and the Mediterranean diet concerning their beneficial impacts on reproductive health.

2. LITERATURE REVIEW

2.1. Folic Acid

2.1.1. Definition

Folic acid was initially identified in 1930 by Lucy Wills at Cambridge University. It was subsequently isolated from the spinach plant in 1941, with its Latin term "folium," signifying leaf. From 1943 to 1944, the synthesis of folic acid was established at pharmacological facilities in the United States. These investigations demonstrated that folic acid is essential for growth, particularly in laboratory animals and specific bacteria. Folic acid, or vitamin B9, is a crucial component of the B-vitamin complex, necessary for DNA synthesis, cellular division, growth, amino acid metabolism, neural tube development, and methylation processes. Folic acid consumption is especially vital for women of reproductive age, as it facilitates the healthy development of the fetus and ensures the normal closure of neural canals during gestation (3).

2.1.2. Chemical Structure of Folic Acid

The chemical formula for folic acid is $C_{19}H_{19}N_7O_6$. It is water-soluble and heat-sensitive, comprising three essential components that must interact for the vitamin to demonstrate its biological activity. The components consist of pterin, p-aminobenzoic acid (PABA), and glutamic acid, linked by peptide bonds and a methylene bridge. While the body can produce certain constituents of folic acid, such as pterin and PABA, the necessary conjugase enzyme for their combination cannot be produced in humans, providing folic acid an essential vitamin (4).

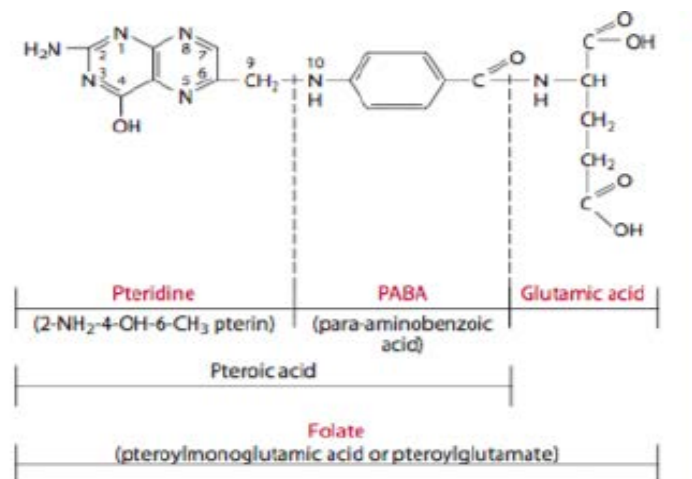


Figure 2. 1 Folic Acid Chemical Structure

2.1.3. The Function of Folic Acid in the Human Body

Folic acid plays an essential role in the biosynthesis of purines and pyrimidines, primarily serving as a substrate in single-carbon transfer processes. It also engages in the metabolism of amino acids like serine, homocysteine, glycine, and methionine (6). Due to the accelerated processes of DNA synthesis and degradation during embryonic development, folic acid is a crucial element during this phase (7). Folate is an essential element for cellular growth via nucleotide synthesis. The demand for folate escalates owing to the differentiation of embryonic and fetal tissues throughout gestation (8). Folic acid is a vitamin essential for DNA synthesis and the synthesis of certain amino acids. Insufficient folic acid in the body mostly impacts the fastest dividing cells, such as platelets, leukocyte progenitor cells, and epithelial cells of the digestive system (9). Tetrahydrofolate (THF) transports single-carbon moieties (methylene, methyl, formyl, or formimino) in the synthesis of methionine, serine, choline, glycine, and purine nucleotides. Folic acid serves as a coenzyme in single-carbon transfer processes, which constitutes its primary activity. It functions in two distinct methods during DNA synthesis: serving as a coenzyme for the synthesis of DNA from its precursors. Folate facilitates the synthesis of methionine, which is essential for the formation of S-adenosylmethionine (SAM). SAM serves as a methionine donor in the methylation processes of certain sections of DNA and RNA. Vitamin B12 and folic acid are essential for the conversion of homocysteine to methionine; a shortage in folic acid results in the buildup of homocysteine and a decrease in methionine synthesis. Elevated homocysteine levels augment the risk of cardiovascular disease and may impair nerve tissue. Insufficient levels of folic acid and Tetrahydrofolate (THF) coenzymes significantly impact rapidly dividing cells, particularly normoblasts, leukocytes, and platelets (10).

2.1.4. Folic Acid Food Sources

Foods are categorized into four classes based on their folate content: excellent, good, moderate, and poor sources of folate. Optimal sources of folate are foods that provide above 100 µg of folate per serving. This group include green leafy vegetables and liver. Nutritious sources of folate are foods that provide 50-100 µg of folate per serving. This group includes cauliflower, chickpeas, kidney beans, and yeast. Moderate folate sources provide 15-50 µg of folate and encompass brown rice, milk, eggs, yogurt, and

cheese. Inadequate sources of folate include foods that contain less than 15 µg of folate, including alcoholic beverages, sugar, seafood, and soft drinks (11).

Table 2.1: Sources of Folate

Food	Micrograms (mcg) DFE per serving	Percent DV*
Beef liver, braised, 3 ounces	215	54
Spinach, boiled, ½ cup	131	33
Black-eyed peas (cowpeas), boiled, ½ cup	105	26
Breakfast cereals, fortified with 25% of the DV†	100	25
Rice, white, medium grain, cooked, ½ cup†	90	22
Asparagus, boiled, 4 spears	89	22
Brussels sprouts, frozen, boiled, ½ cup	78	20
Spaghetti, cooked, enriched, ½ cup†	74	19
Lettuce, romaine, shredded, 1 cup	64	16
Avocado, raw, sliced, ½ cup	59	15
Spinach, raw, 1 cup	58	15
Broccoli, chopped, frozen, cooked, ½ cup	52	13
Mustard greens, chopped, frozen, boiled, ½ cup	52	13
Bread, white, 1 slice†	50	13
Green peas, frozen, boiled, ½ cup	47	12
Kidney beans, canned, ½ cup	46	12
Wheat germ, 2 tablespoons	40	10
Tomato juice, canned, ¾ cup	36	9
Crab, Dungeness, 3 ounces	36	9
Orange juice, ¾ cup	35	9
Turnip greens, frozen, boiled, ½ cup	32	8

2.1.5. Recommended Dose

The "dietary folate equivalent" is the daily recommended folate intake, which is determined by the bioavailability of various forms. The bioavailability of folic acid in food supplements and fortified foods is 85%, whereas the bioavailability of folate in foods is 50% (12). The safe folate intake amount for pregnant women in Turkey has been established as 400 mcg/day, with a maximum dose allowed of 1 mg/day, according to research conducted in the country (13). For example, 1 mcg of dietary folate equivalent (DFE) is equivalent to 1 mcg of folate in foods, 0.6 mcg of folic acid supplement taken with a meal, and 0.5 mcg of folic acid supplement taken on an empty stomach (14). Pregnant women are advised to consume 600 micrograms of folate per day, as per the European Food Safety Authority (EFSA). Natural foods are a secure source of folate, and

high intakes do not result in any negative consequences. According to the European Food Safety Authority (EFSA), synthetic folic acid has a tolerable upper limit of 1000 mcg/day (15).

Table 2.2: Recommended Dietary Allowances (RDAs) Folate

Age	Male	Female	Pregnancy	Lactation
Birth to 6 months*	65 mcg DFE*	65 mcg DFE*		
7–12 months*	80 mcg DFE*	80 mcg DFE*		
1–3 years	150 mcg DFE	150 mcg DFE		
4–8 years	200 mcg DFE	200 mcg DFE		
9–13 years	300 mcg DFE	300 mcg DFE		
14–18 years	400 mcg DFE	400 mcg DFE	600 mcg DFE	500 mcg DFE
19+ years	400 mcg DFE	400 mcg DFE	600 mcg DFE	500 mcg DFE

2.1.6. Causes of Deficiency

The folate storage in a healthy individual ranges from around 5 to 20 mg. The factors contributing to its lower levels include inadequate folate consumption, diminished absorption, and escalated demand. By examining the overarching reasons;

Insufficient Nutrition: A primary cause of folic acid insufficiency is the inadequate intake of folate in the diet. This circumstance may arise from factors such as inadequate dietary practices, restrictive eating patterns, or insufficient intake of fruits, vegetables, legumes, and fortified grains high in folic acid (16)

Malabsorption Disorders: Certain medical diseases impacting the digestive tract may inhibit the absorption of folate from dietary sources. These illnesses encompass celiac disease, Crohn's disease, and several malabsorption disorders impacting the small intestine (17).

Alcoholism: Excessive alcohol intake can impair intestinal cell structure, decreasing folic acid absorption, or may result in folic acid insufficiency by elevating folate excretion in urine. It may also induce hepatic damage and interfere with the processes regulating folate conversion(18).

Elevated Demand: Certain events or circumstances that heighten the body's requirement for folate may result in deficiency if dietary intake is inadequate to satisfy the increased need. Examples encompass pregnancy, lactation, phases of accelerated growth (such as infancy and adolescence), and chronic illnesses that induce heightened cellular regeneration(18).

Drugs: Certain drugs may induce folic acid insufficiency by impairing the absorption or metabolism of folate. The drugs comprise anticonvulsants (including phenytoin and carbamazepine), methotrexate (used in cancer chemotherapy and autoimmune disorders), sulfasalazine (employed in inflammatory bowel disease), and some antibiotics (17).

Genetic Factors: Infrequent genetic diseases that impair folate metabolism or transport may lead to folic acid deficiency. Specifically, Hispanic and Latin populations may have genetic folate malabsorption and methylenetetrahydrofolate reductase (MTHFR) insufficiency (19).

Elevated Losses: Chronic hemolytic anemias, renal dialysis, and certain drugs that enhance folate excretion in urine may augment excretion and induce deficiency (17).

Vitamin B12 Deficiency: Vitamin B12 functions as a coenzyme in the production of methylfolate, the bioactive form of folate. Vitamin B12 insufficiency results in decreased methylfolate levels, hence impacting folate metabolism. This results in disturbances in folate metabolism and subsequent folate insufficiency in individuals (20).

Vitamin C Deficiency: Vitamin C functions as an antioxidant and cofactor in numerous metabolic pathways within the body. Vitamin C specifically inhibits the oxidation of folate and aids in maintaining its active form. Vitamin C insufficiency may lead to increased folate oxidation, hence diminishing folate efficacy and resulting in its inadequacy (20).

Birth control drugs may indirectly cause folate insufficiency, although they do not directly induce it. Nonetheless, several pathways exist by which birth control drugs may influence folate metabolism:

Reduced Folate Absorption: Certain research indicate that oral contraceptives may diminish the intestinal absorption of folate. Oral contraceptives, particularly those

with estrogen, can interfere with folate absorption in the intestines. This may diminish folate absorption and result in insufficiency (21).

Metabolic Alterations: Contraceptive drugs may influence metabolism by modifying the hormonal homeostasis in the body. These alterations may hinder the process of transformation of folate to its active form or its utilization. In this instance, although the demand for folate rises in certain women, contraceptive tablets may be inadequate for covering this requirement (21).

Interference with Methylation Processes: Certain contraceptive tablets may disrupt methylation, a crucial physiological function. Methylation is involved in the synthesis of methylfolate, the bioactive form of folate. Disruptions in this mechanism may adversely impact folate metabolism and result in folate insufficiency. (21).

In conclusion, these pathways imply that oral contraceptives may indirectly lead to folate insufficiency.

Investigations into Folic Acid Deficiency

Symptoms of folic acid insufficient encompass headache, dizziness, difficulty concentrating, palpitations, and shortness of breath. The gastrointestinal system may induce abdominal pain, nausea, and, in certain instances, fever.

Given that folic acid is especially vital for cellular proliferation, its absence results in disruptions in these processes. A deficiency in folic acid, which is crucial for homocysteine metabolism, leads to the buildup of homocysteine, hence inhibiting methylation processes and gene expression. This elevates the risk of cancer. Folic acid deficiency leads to a reduction in blood values. Macrocytic megaloblastic anemia may arise as erythrocyte levels deteriorate (22).

2.1.7. Impact of Deficiency on Health

Folic acid is essential for fetal development and should be taken as a supplement during the preconception period and during pregnancy. It is beneficial for fetal development and the elevation of erythrocyte levels. The deficit leads to preeclampsia, an elevated risk of miscarriage, and increased mortality rates. Additionally, it has been

reported that autism, hyperactivity issues, and cognitive developmental abnormalities could arise in infants due to the absence of folic acid supplementation. (23).

2.1.7.1. Neural Tube Defect

Neural tube defects (NTDs) are congenital anomalies affecting the brain, spine, or spinal cord, commonly appearing prior to the recognition of pregnancy and observable in developing fetuses during the initial month of gestation. Spina bifida and anencephaly are the two predominant forms of neural tube abnormalities (24).

During the initial phase of the third week of embryogenesis, ectodermal cells undergo division into two individual cells. This separation leads to the formation of neural skin from ectoderm. The neural tube and neural fissure originate from neural ectoderm. The brain and cerebellum develop in the cranial section of the neural tube, whereas the spinal cord originates in the caudal segment. The neural processes that emerge from the folds of the neural canal are responsible for the development of the spinal and cranial nerves (24).

The closure of the cranial opening in the neural tube occurs between the 21st and 26th days post-fertilization. The closure of the opening in the caudal area occurs between days 23 and 28. The cranial end of the neural tube closes initially, succeeded by the caudal end. The neural tube fully closes during the fourth week of embryonic development. If closure is not finalized by the fourth week, a neural tube defect will arise (25).

Neural tube defects (NTDs) arise in roughly 3,000 pregnancies annually in the United States. Myelomeningocele is the predominant form of spina bifida in the United States, impacting around 1,500 infants annually. Anencephaly impacts over 1,000 infants annually in the United States (25).

Folic acid is a vital nutrient that facilitates the closure of neural tubes. Consequently, if a deficiency exists before to conception and the pregnancy is unplanned, the likelihood of fetal defects is significantly elevated. Consequently, the administration of folic acid prior to and during pregnancy is crucial (25).

2.1.7.2. Cardiovascular Disease

In the 1990s, hyperhomocysteinemia has been proposed as an independent risk factor for atherosclerosis. Folic acid significantly influences the dietary regulation of homocysteine levels. Daily intake of 0.5–5.0 mg of folic acid has been shown to decrease serum homocysteine levels by around 25%, subsequently lowering the risk of ischemic heart disease by 11% and stroke by 19%. Nevertheless, findings from placebo-controlled, double-blind studies investigating the impact of folic acid intake on reducing the risk of cardiovascular events are contradictory (26). In the Aspirin/Folate Polyp Prevention Trial, a daily dose of 1 mg folic acid (with some individuals also receiving low-dose aspirin) did not demonstrate significant differences in cardiovascular disease or overall mortality when compared to the placebo group. In the Vitamins for Stroke Prevention Study, no significant differences were noted in the incidence of myocardial infarction, stroke, or cardiovascular mortality between the folic acid and B-complex vitamin supplementation groups and the placebo group among patients with a prior history of stroke (27).

A meta-analysis of 12 randomized controlled trials involving 47,523 patients observed a decreased risk of stroke, although found no statistically significant change in the risk of overall mortality, cardiovascular mortality, or coronary heart disease (28).

The China Stroke Primary Prevention Study revealed the advantageous effects of folic acid supplementation in 20,000 patients with primary arterial hypertension and the MTHFR C677T genotype, who had no prior myocardial infarction or stroke. This study observed a notable decrease in the occurrence of ischemic stroke and other cardiovascular events in the group administered enalapril with folic acid, with these effects being more prominent in individuals with low baseline folate levels. The research indicates that folic acid supplementation could be utilized for stroke prevention in zones where folate insufficiency is prevalent and sufficient dietary intake is insufficient. (29).

2.1.8. Determination of Deficiency

The standard serum folate range is 5–20 ng/ml, while deficiency is indicated by levels falling below 3 ng/ml. Folic acid insufficiency is identified through laboratory tests and initially presents as a decreased serum folate level. This deficit leads to hyperpigmentation of neutrophils, a macrocytic morphology of erythrocytes, and megaloblastic alterations in the bone marrow. A reduction in hemoglobin levels may be

noted; however, due to the 120-day lifespan of erythrocytes, such reductions may be identified later in laboratory analyses (30).

2.2. Utilization and Awareness of Folic Acid Among Women of Reproductive Age

The preconceptional period includes the timeframe during which couples are organizing themselves for parenthood. During the preconception period, one effective measure to reduce potential postnatal complications, avoid fetal abnormalities, and enhance maternal and fetal health is the initiation of folic acid supplementation (31). Folic acid, known as vitamin B9, is an essential water-soluble vitamin that cannot be produced by the human body. The primary function of folic acid is to participate in the cell division cycle (32). Given that cellular division and growth accelerate during pregnancy, it is crucial to consume folic acid supplements in the preconceptional phase and throughout gestation, related to the accelerated fetal development, the progressive enlargement of the uterine and placenta, and the rise in maternal erythrocyte volume. Given that the demand for folic acid escalates during pregnancy and that it helps prevent neural tube defects, it is beneficial to commence its use from the preconception phase. Consequently, numerous countries, groups, and organizations have advocated for the intake of folic acid from the preconception phase through a certain duration of pregnancy, and standards have been established concerning the ideal amount of folic acid (33).

The World Health Organization (WHO) advises the intake of 400 µg of folic acid from the onset of pregnancy until the 12th week of gestation to decrease the risk of maternal anemia, preterm birth, low birth weight infants, and neural tube defects (34).

The Polish Society of Gynecologists and Obstetricians (PSGO) suggests that all women of reproductive age should consume 400 µg of folic acid daily during the preconception period. In the lack of an immediate danger of neural tube defects (NTDs) during pregnancy, it is advised to maintain supplementation at a dosage of 400-800 µg until the 12th week of gestation and to continue with 600-800 µg from the 12th and 13th weeks till the breastfeeding period. The Polish Society of Gynecologists and Obstetricians (PSGO) has identified the risk factors for intrauterine growth retardation (IUGR) as familial or maternal history of IUGR, preeclampsia, diabetes, gastrointestinal diseases, liver failure, smoking status, use of antiepileptic medications, and a prior occurrence of a neonate with neural tube defects (NTD). It has recommended a daily folic acid intake of

800 µg commencing from the 12th week of the preconception period and continuing throughout lactation (35).

The CDC (Center For Disease Control) recommends that folic acid supplements, classified as preventive services, should be initiated three months prior to conception and maintained at a dosage of 400 µg for 10-12 weeks post-conception to avert roughly 75% of fetal disorders, including neural tube defects (NTD) (36).

The American College of Obstetricians and Gynecologists (ACOG) suggests women to commence 400 µg folic acid supplementation one month prior to conception and to persist with supplementation during the first trimester of pregnancy (37).

The Royal College of Obstetricians and Gynecologists (RCOG) suggests that all women of reproductive age need to take 400 µg of folic acid supplements daily, beginning from the preconception phase and persisting until the 12th week of pregnancy. Women in the high-risk category are identified by a prior history of delivering an infant with a neural tube defect (NTD), a familial history of NTD in their partner, the use of antiepileptic medication, the presence of thalassemia, diabetes, or celiac disease, and a body mass index exceeding 30. The advised daily dosage of folic acid supplementation for those in the high-risk category is 5000 µg (5 mg) (38). The Society of Obstetricians and Gynecologists of Canada (SOGC) advocates for folic acid supplementation among women of reproductive age, modifying the daily dosage based on categorized risk factors. Individuals in the low-risk category are individuals without a personal or familial history of neural tube defects (NTD) in themselves or their partners. This group is advised to commence folic acid supplementation 2-3 months prior to conception, maintain supplementation throughout gestation and for 4-6 weeks postpartum or during lactation, with a daily dosage of 400 µg (39). Individuals classified by the association as high-risk categories include those with a prior history of giving birth to a child with a neural tube defect (NTD) and those whose partners possess a familial history of delivering a child with neural tube defects (NTD). Women in the high-risk group should start folic acid supplementation at least 3 months prior to conception. It is advised to consume 4000 µg during the initial 12 weeks of gestation; the suggested daily supplement dosage throughout pregnancy and the lactation period ranges from 400 to 1000 µg. The National Institute for Health and Clinical Excellence (NICE) has issued recommendations for the daily dosage of folic acid supplementation during the preconception phase and pregnancy.

A daily dosage of 5000 µg of folic acid is advised for the high-risk population. The "Prenatal Care Management Guide" established by the Turkish Ministry of Health in 2018 advises that all women of reproductive age intending to conceive should commence folic acid supplementation at a dosage of 400-800 µg daily at least one month prior to conception and maintain this program until the 12th week of gestation. The high-risk populations for neural tube defects (NTD) include individuals utilizing antiepileptic medications, those with a prior history of pregnancy affected by neural tube defects (NTD), and individuals with obesity and diabetes. For the prevention of neural tube defects (NTD), it is advised that this demographic consume 4000 µg (4 mg) of folic acid three months prior to conception and maintain this intake until the twelfth week of gestation (40).

All guidelines aim to enhance maternal and fetal health. Although these guidelines, the incidence of folic acid consumption among women of reproductive age is elevated during the first trimester of pregnancy; nevertheless, insufficient emphasis is placed on folic acid utilization in the preconceptional phase. Consequently, midwives bear significant responsibilities commencing from the preconceptional phase. The significance of folic acid intake during the preconceptional era must be articulated and underlined to individuals. In the presence of dangerous circumstances, the dosage of folic acid should be advised according to established criteria (41).

2.2.1. Awareness of Folic Acid Among Women of Reproductive Age in Turkey and Globally

A research by Raad and AbuAlhommos (2021) assessed the awareness levels of women of reproductive age concerning the utilization of folic acid supplements prior to pregnancy. The study highlighted that a significant number of women lack enough knowledge regarding folic acid, and that variables such as educational attainment and accessibility to healthcare facilities influence folic acid utilization. In this study revealed that 72.4% of participants (n = 342) exhibited low awareness of folic acid, whereas only 24.6% (n = 142) shown a decent degree of awareness.

The predominant source of information regarding folic acid utilization was physicians (83.9%), succeeded by family members (9.3%) and social media (4.3%). Merely 15.0% of ladies accurately recognized it as vitamin B9.

Merely 17.9% accurately recognized 400 mcg as the appropriate daily dosage. A statistically significant difference in folic acid awareness was observed among pregnant women compared to other groups.

Educational efforts, workshops, television programs, and social media should be employed to enhance public knowledge on the significance of folic acid consumption throughout the pre-pregnancy phase. (42).

A study conducted in Turkey investigated the awareness, knowledge, and utilization of folic acid among women of reproductive age. The study indicated that non-pregnant women showed lower levels of awareness and understanding regarding folic acid compared to pregnant women. Factors such as educational attainment and access to healthcare facilities influence folic acid utilization, and it was noted that folate intake among non-pregnant women drops below the recommended amounts. Researchers conducted a study in Turkey to examine the factors influencing awareness, knowledge, and utilization of folic acid. This study will give the critical data regarding folic acid consumption among women of reproductive age in Turkey. The proportion of non-pregnant and pregnant women consuming folic acid supplements or multivitamins containing folic acid was 15.1% and 70.2%, respectively (43).

In conclusion, our study revealed that awareness, knowledge, utilization of folic acid, and dietary folate intake were greater among pregnant women compared to non-pregnant women. (43).

Another study showed that assessed the knowledge and awareness of folic acid and supplements among university students in Saudi Arabia. The research indicated that university students typically possess limited understanding of the significance and function of folic acid, with educational attainment, training in health-related disciplines, and access to healthcare resources influencing their knowledge levels. It was asserted that educational programs and awareness initiatives should be increased (44).

2.3. Health Policies for Folic Acid Deficiency

Specific health programs have been established to reduce folic acid deficiency. The following items have been listed below:

- ***Meeting daily folic acid requirements through dietary sources:*** Research conducted in Turkey indicates that individuals typically obtain an average of 350 mcg of folic acid daily. Nonetheless, because of to a 30% reduction of folic acid after cooking, this quantity decreases to roughly 250 mcg. Consequently, it is noted that particularly women who are planning to conceive or are pregnant do not obtain sufficient folic acid through their normal diet. Providing adequate nutrition information is essential for the natural development of folic acid. This teaching should encompass appropriate cooking techniques that will reduce folic acid degradation (45).
- ***Fortifying foods with folic acid:*** The Turkish Food Codex mandates the addition of iodine exclusively to table salt. Nonetheless, given that adults in our country consume around 250 mcg of folic acid daily, it is highlighted that meals fortified with folic acid and vitamin B12 may be helpful. This can enhance sufficient folic acid consumption among the general populations. The research indicated a rise in the average intake level by supplementing cornflakes, a widely consumed cereal in the United States, with folic acid. Consequently, research on folic acid fortification ought to be undertaken in Turkey (46).
- ***Advising folic acid supplementation for women of reproductive age:*** Women intending to conceive should commence a daily intake of 400 mcg of folic acid 2-3 months before to conception and maintain this routine throughout gestation. Nonetheless, given that 40% of pregnancies in Turkey are unintentional and the implementation of this strategy becomes challenging. Nonetheless, it has been asserted that requisite research must be undertaken, folic acid-containing formulations should be provided at no cost, their utilization should be under observation, and their efficacy should be assessed. Women having a history of giving birth to infants with neural tube defects (NTD) or those in the high-risk category (utilizing antiepileptic medications and insulin) are advised to consume 4 mg of folic acid daily (47).

2.4. Mediterranean Dietary Pattern

2.4.1. Definition

The Mediterranean diet refers to the dietary practices of those located in Mediterranean coastal nations, such as Greece, Italy, Southern France, Crete, Spain, and certain regions of the Middle East (48).

The Mediterranean diet is not a defined dietary system, but rather the conventional eating practices of nations nearby to the Mediterranean Sea (48).

2.4.2. General Attributes

This nutritional plan includes the consumption of lean animal products, fruits, vegetables, eggs, oilseeds, and seafood. It has been shown that cardiovascular disorders and chronic conditions, such as cancer, are not more prevalent in civilizations maintaining to this eating pattern (49).

The Mediterranean diet was scientifically described by Ancel Keys in the 1960s following the "Seven Countries Study," which examined the dietary practices of individuals in the Mediterranean Area. The concept proposed by Keys has evolved and evolved throughout the years (49).

This study by Ancel Keys has initiated more research on the Mediterranean Diet, as individuals adhering to it have longer lifespans and reduced cardiovascular disease rates, despite high fat intake. (49, 50).

The Mediterranean Diet comprises olive oil, whole grains, vegetables, fruits, seafood, and moderate wine drinking. Processed meat products are minimally present in their diets. In addition to nutrition, exercise is also prevalent in communities adhering to this dietary plan. (49, 51).

A study on the Mediterranean Diet revealed that adults over the age of 65 had increased life durations. It was noted that the polysaturated fatty acids obtained from seafood, particularly omega-3, have a mild influence on cardiovascular illnesses, resulting in reduced mortality rates. This phenomenon is attributed to the intake of olive oil and meals rich in antioxidants. This antioxidant property has been demonstrated to

decrease illness risk through the anti-inflammatory actions of vegetables and fruits rich in polyphenols within the Mediterranean Diet. (52, 53).

The Mediterranean Diet features a nutritional pattern high in plant-based nutrients, focusing the intake of seasonal vegetables and fruits, with a primary use of olive oil, while promoting sustainability.

Pyramids are utilized in the characterization of the Mediterranean diet. This dietary pyramid defines the quantities of food intake on a daily and weekly basis. Three pyramids have been constructed to date. The currently utilized pyramid has been created with greater complexity and intensity to capture attention compared to others (54).

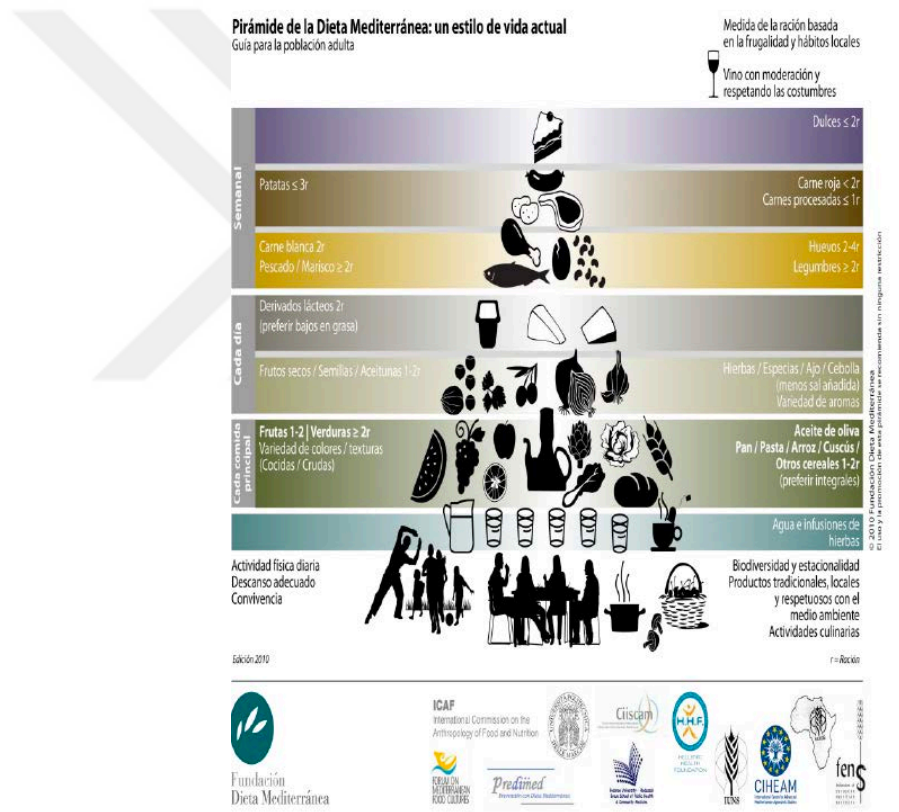


Figure 2.2: Mediterrian Diet Pyramid (55)

2.4.3. Mediterranean Diet Nutrition and Features

The Mediterranean Diet Pyramid classifies foods into daily, weekly, and infrequent intake. Daily diets should include grains, vegetables, and fruits.

These quantities are:

- Consume 1-2 servings of whole grains at each meal.
- Consume 2 or more servings of vegetables at main meals, at least 1 serving uncooked (for daily vitamin and minerals)
- Each main meal should have 1-2 serving of fruit (preferred vegetables and fruit should vary in colour and texture).
- Moderate consumption of dairy products (yoghurt, cheese, and other fermented foods) is recommended, especially low-fat ones (56).

Weekly Dietary Items

- Weekly protein sources should include animal and plant. In tiny amounts and for flavor, animal-derived foods : Eggs (2-4 servings), white meat (2 servings), fish, and shellfish (2 or more servings) are high-protein foods.
- Choose diverse seafood.
- Red and processed meats should be eaten sparingly (less than 2 meals per week and ideally lean) and rarely.
- Eat legumes and grains together.
- Eat 3 or less potatoes each week (42).

These should be eaten rarely;

- Top sweets with high sugar and fat content should be eaten sparingly.
- Little sugar, sugary foods (candy, cake, etc.), and sugary drinks (sweetened fruit juices and soft drinks) are okay (42).

When considering the Food Pyramid overall;

- Consider drinking 1.5-2 liters (8-10 glasses) per day. Age, F.A., individual differences
- This pyramid centers on olive oil, especially extra virgin.

- Spices, herbs, garlic, and onion improve flavor better than salt.
- Drink moderate wine (1/15 g for women, 2/30 g for men) with meals daily. (If religious and socially fit) (56).

Mediterranean Diet Pyramid covers cultural and lifestyle factors as well as food consumption frequencies and amounts. These include moderation, socialization, cooking, seasonality, biodiversity, organic, traditional, and local food production (56).

2.4.4. Content of the Mediterranean Diet

2.4.4.1. Olive Oil

Olive oil constitutes the fundamental element of the Mediterranean Diet. Due to its content of unsaturated fatty acids, fat-soluble vitamins, and polyphenols, it demonstrates anti-inflammatory, neuroprotective, chronic disease-preventive, and antioxidant effects. It significantly decreases the danger of coronary heart disease, protections against cancer, and reinforces the immune system, generating beneficial benefits on health (56).

2.4.4.2. Legumes and Grains

Legumes reduce endothelial dysfunction, regulate blood pressure, and lower cholesterol levels due to their flavanol concentration, which is the primary polyphenolic component. The fiber constituents present in whole grains provide anti-inflammatory properties and reduce oxidative implications. Research has also demonstrated that they modulate glucose metabolism and provide antioxidant properties (57).

2.4.4.3. Oilseeds

They are foods high in polyphenols, flavonoids, isoflavonoids, and phytosterols. Their components have a proactive impact against cardiovascular conditions by decreasing plasma lipid levels (58).

2.4.4.4. Fruit and Vegetables

The Mediterranean Diet, characterized by a diverse array of vegetables and fruits, constitutes a nutrition plan abundant in fiber, vitamins, minerals, and flavonoids. These components have antioxidant capabilities and provide a protective effect against cellular damage. Phytosterols have benefits in lowering cholesterol levels and decreasing the risk of cardiovascular ailments. While these foods do not effectively supply energy to the body, they play a crucial role in the protection and development of cells due to their antioxidant features (59).

2.4.4.5. Milk and Dairy Products

The Mediterranean Diet contains cheese and yogurt, particularly from the dairy category. Individuals with lactose intolerance have greater tolerance to these meals compared to milk. It possesses probiotic properties due to the presence of lactic acid bacteria. The study indicated that it decreases the risk of colon cancer due to its beneficial impact on intestinal health (60).

2.4.4.6. Seafood

Fish items high in omega-3 offer protection against cardiovascular conditions due to their high concentration of polyunsaturated fatty acids. It possesses preventive effects against conditions due to its immune-enhancing and anti-inflammatory properties (57).

2.4.4.7. Red Wine

Red wine, a beverage high in resveratrol polyphenol, exhibits anti-inflammatory benefits. Moderate wine drinking beneficially impacts lipoprotein levels, platelet function, and endothelial dysfunction due to its polyphenol content. It also enhances cardiovascular health by augmenting nitric oxide synthesis and producing beneficial effects on blood arteries (61).

2.4.5. The Impact of the Mediterranean Diet on Health

The Mediterranean Diet, characterized by an extensive selection of nutrients, positively influences human health and offers preventative effects against diseases. Some

studies have demonstrated its efficacy in decreasing illness risks, including metabolic syndrome, diabetes, cardiovascular disease, and specific cancer types (62).

Besides the impacts of cardiovascular illnesses, it has also been noted to exert a beneficial influence on conditions such as obesity and hypertension. Research indicates that those maintaining to the Mediterranean Diet have reduced body weights and inflammatory levels relative to those who do not adhere to this dietary routine (39,40) These people exhibit elevated blood levels of vitamins A, C, and E, as well as increased HDL cholesterol levels (62).

The Mediterranean Diet and Obesity

The World Health Organization defines obesity as the excessive accumulation of fat in adipose tissues that adversely affects health. Its growing prevalence throughout the years made it a significant health issue. Foods that effectively diminish fat mass associated with obesity comprise low glycemic index fiber foods, oilseeds, proteins, and antioxidant elements. The Mediterranean Diet, characterized by its nutrient-rich composition, has been shown to enhance satiety, regulate blood sugar levels, and positively influence cholesterol levels, resulting in a notable reduction in central obesity and waist circumference measurements (63).

The Mediterranean Diet and Type 2 Diabetes

Type 2 diabetes is a condition that arises from inadequate insulin secretion by pancreatic beta cells or from tissue resistance to the insulin produced. In the progression of this disease, particularly the excessive buildup of body fat, an unhealthy diet, a sedentary lifestyle, and genetic predispositions are significant risk factors for the development of diabetes (64).

Research indicates that adherence to the Mediterranean Diet decreases the risk of Type 2 Diabetes by 19-23%. A separate study indicated that this diet positively influenced HbA1C levels. Olive oil, red wine, legumes, and high-fiber fruits and vegetables in the diet were significantly beneficial (64).

Cancer

The incidence of cancer cases, which ranks second only to heart disease as a leading cause of death worldwide, is on the rise. The World Cancer Research Fund indicates that a high intake of fruits and vegetables, whole grain products, and a limited consumption of red meat may decrease the risk of cancer. The Mediterranean Diet, characterized by its inclusion of antioxidant-rich foods like polyphenols and carotenoids, is believed to offer protective benefits against cancer. Research indicates that the Mediterranean diet reduces tumor cell size due to its content of polyphenols, antioxidant compounds, and omega-3 rich food sources. Additionally, it promotes the development of healthy cells by influencing DNA repair and synthesis processes (65).

Meta-analysis studies indicate that cancer patients adhering to a nutrition plan based on the Mediterranean Diet experience a reduction in the risk of liver, stomach, colorectal, and breast cancers. The primary factors for mitigating the risk of breast cancer include elevating sex hormone binding globulin levels and lowering estrogen levels. A recent study identified a reduction in skin cancer incidence following a 15-year cohort analysis (65).

2.5. The Correlation Between the Mediterranean Diet and Folic Acid Consumption

The Mediterranean Diet, a dietary pattern important for its high level of folic acid-rich foods, is the fundamental basis for its beneficial health effects in this regard. The green leafy vegetables included are significant plant sources commonly used in the Mediterranean diet and are rich in folate. Simultaneously, legumes that enhance the protein and fiber content of the diet serve as significant sources of folate. Avocado, a source of healthful fats, and citrus fruits are rich in vitamins and folate. Moreover, due to its high quantity of whole grains and nuts, the diet contains both energy density and folate levels. Folate-rich foods enhance the beneficial effects of the Mediterranean diet on cellular regeneration, DNA synthesis, and fertility, therefore significantly contributing to the requirement for folate (66).

2.5.1. Impact of the Mediterranean Diet on Folic Acid Deficiency

Research on the Mediterranean Diet, characterized by foods abundant in folic acid, has investigated its efficacy in addressing folic acid deficiency. This diet, possessing antioxidant and anti-inflammatory properties, lowers the risk of folic acid insufficiency. The research indicated that the Mediterranean diet enhances folic acid intake, and the

consistent consumption of vegetables and legumes high in this vitamin positively influences cardiovascular health and aids in the prevention of birth abnormalities. This diet model is proposed in order to solve deficiencies due to its superior folic acid concentration relative to other dietary models (67).

As study revealed a beneficial health benefit related to a higher intake of folic acid-rich foods compared to other dietary models (68).

Potential Associations Between the Mediterranean Diet and the Prevention of Neural Tube Defects

Folic acid is essential for DNA synthesis, cellular division, and neural tube formation. Research indicates that sufficient folic acid consumption diminishes the occurrence of neural tube defects, particularly during the first trimester of gestation and prior to conception. The Mediterranean diet is believed to be useful in reducing neural tube defects due to its abundance of folic acid-rich foods. Consuming folic acid-rich foods, such as whole grains, citrus fruits, lentils, and green leafy vegetables daily, supports pregnant women in reaching their folate requirements. The Mediterranean diet's anti-inflammatory and antioxidant elements positively influence fetal growth by decreasing oxidative stress and inflammation during pregnancy (69).

A study investigated the impact of the Mediterranean diet and folic acid on neural tube malformations. The study claims that folic acid is efficient in avoiding neural tube abnormalities, and the Mediterranean diet, being high in folate, contributes to this preventive effect. Research indicates that sufficient folic acid intake, particularly before to pregnancy, may decrease threats and that the Mediterranean diet is important in this regard. The research indicates that folic acid and the Mediterranean diet are crucial, particularly for women deciding to conceive, and that health policies may assist in the prevention of congenital abnormalities by advocating this dietary approach (70).

2.5.2. The Impact of the Mediterranean Diet on Health During Gestation

The Mediterranean Diet is suggested during pregnancy as it enhances mother and fetal health. The Mediterranean Diet is optimal for pregnancy as it includes sufficient fresh vegetables, fruits, whole grains, legumes, healthy oils (notably olive oil), and

omega-3-rich fish to promote females and fetal health. Pregnancy demands increased energy and nutrient intake; thus, these meals offer important support. (52).

The Mediterranean diet contributes essential micronutrients during gestation, such as folic acid, iron, calcium, and omega-3 fatty acids. Mediterranean diets involve green leafy vegetables, legumes, and whole grains, which are high in folic acid, useful in reducing neural tube abnormalities. Nutritious oils like olive oil and sea creatures are abundant in omega-3 fatty acids, essential for embryonic brain and retinal development. Omega-3 fatty acids decrease the risk of preterm birth by regulating birth weight (52).

The Mediterranean diet enhances pregnant health through its anti-inflammatory and antioxidant attributes. The antioxidants and anti-inflammatory compounds in the diet mitigate the risk of pregnancy-related complications, including preeclampsia and gestational diabetes (53).

A meta-analysis revealed that adherence to a Mediterranean diet decreased the risk of gestational diabetes by 65% (72). Another study demonstrated that the adoption of this dietary routine decreased the odds of premature birth (73).

A study investigating the Mediterranean diet's impact on fetal development showed an increase in embryonic volume. It was also stated that it decreased the probability of low birth weight; this was attributed to the Mediterranean diet, enhanced with olive oil and almonds, which significantly enhanced placental circulation (74).

A cohort research indicated that following to the Mediterranean diet correlated with reduced fat levels and decreased leptin levels in individuals. This is attributed to the intake of foods rich in antioxidants and those with a low glycemic index (75).

2.5.3. The Importance of the Relationship Between Folic Acid and the Mediterranean Diet

Effects of Folic Acid Supplementation and Mediterranean Diet on Health

The Mediterranean Diet, characterized by a nutritional profile abundant in folic acid, may no longer provide adequate nutritional content due to reduced nutrient quality, evolving lifestyles, advancements in technology, and alterations in food production

methods. This alteration can lead to adverse effects on fetal development in pregnant women (76).

The losses sustained during cooking, washing, and food absorption, along with the reduction in bioavailability, interfere with individuals from obtaining adequate folic acid through nutrition. The Mediterranean Diet, known to decrease the risk of neural tube defects (NTD) during pregnancy, is believed to require supplementation due to its inadequate efficacy alone. A randomized controlled research implemented a policy of folic acid enrichment and supplementation to minimize birth complications in unexpected or unwanted pregnancies. Simultaneously, European nations have reported that a daily consumption of 0.4 mg of folic acid is the most effective strategy for preventing the development of neural tube defects (NTDs) (76).

According to the findings of the research that was carried out in the United States, the typical quantity of folic acid that is obtained from nutritional supplements and natural foods was found to be around 102 micrograms. Folic acid supplementation is advocated for since the recommended amount of folic acid consumption for women is 400 micrograms. Folic acid supplementation is supposed to be taken in order to meet this recommendation (76).

2.5.4. Folic Acid Use and Health Policies to Increase Compliance with the Mediterranean Diet

Research is being conducted to enhance the utilization and consumption of folic acid by the states. Research conducted in America indicates that the occurrence of neural tube defects (NTDs) falls by 31% by the fortification of corn flakes with folic acid, a widely consumed cereal aimed at alleviating folic acid deficiency (77).

In the nations neighboring Chile, the reduction in neural tube defects (NTD) prevalence reaches as high as 92%. Consequently, the enrichment of folic acid is crucial for enhancing its utilization (77).

In countries adhering to the Mediterranean Diet, characterized by its high folic acid content, moderate compliance is noted in England and Scotland, whereas this rate is elevated in the Mediterranean Region. The distribution of dietary information within health policies has risen, particularly on folic acid and the Mediterranean Diet, hence

enhancing awareness and knowledge levels in Western countries beyond the Mediterranean Region (77).

The Mediterranean diet's enhancement of folic acid awareness among women of reproductive age is essential for preserving fertility health and preventing anomalies, including prenatal neural tube defects (NTD) (69).

Research in this area indicates that the Mediterranean diet enhances women's fertility due to its elevated folate content, facilitating the natural intake of this essential nutrient. Simultaneously, enhanced adherence to the Mediterranean diet could decrease demand for folic acid supplementation in women, as this dietary pattern offers a consistent and balanced nutritional guidelines that facilitates folate uptake from natural food sources. Consequently, supporting for the Mediterranean diet alongside health measures that enhance folic acid awareness can elevate the overall health of women of reproductive age and facilitate healthy development during pregnancy (69).

3. MATERIALS AND METHODS

3.1. Purpose and Type of Research

This study aims to determine the correlation between folic acid awareness and utilization among women of reproductive age and adherence to the Mediterranean diet. The study is to assess the understanding and utilization of folic acid among women of reproductive age and to evaluate the adherence of those methods to the principles of the Mediterranean diet. The objective is to examine the impact of folic acid consumption on women's health parameters. The findings generated from the study will scientifically inform the formulation of health policies and nutrition education initiatives designed to enhance awareness of folic acid. This study is aimed at illustrating the significance of folic acid for women of reproductive age and to lay out ways to enhance nutritional practices and promote public health.

3.2. Place and Time of the Research

The research was conducted face to face among female employees and customers at the BBM (BÜŞRA BEYZA MERT) Polyclinic.

3.3. Universe and Sample of the Research

The universe of the research was women between the ages of 18-45. Female individuals in the BBM (BÜŞRA BEYZA MERT) Polyclinic were taken as a sample.

3.4. Data Acquisition Methods

A 22-question survey was developed by analyzing surveys utilized in prior studies on analogous subjects in the literature. Following the provision of information regarding the topic and objectives of the research, the prepared questionnaire was administered to the participants through a face-to-face interview method. The survey form is located in Appendix-1.

3.5. Data Collection Tools

The data consists of a MEDAS Scale (Mediterranean Diet Adherence Scale), a questionnaire form consisting of 22 questions, Food Consumption Frequency, and a total

of 25 questions in the Food Consumption Record, which was compiled by the researchers and the consultant through a literature review.

The questionnaire comprises 22 inquiries. Five questions obtain information regarding sociodemographic variables, including age, marital status, education level, and monthly income. The subsequent five questions were created to gather information regarding pregnancy status. The inquiries encompass pregnancy status, prior pregnancy experience, number of live births, instances of fertility treatments or abortions, and planning status. The final 12 questions were designed to assess knowledge on folic acid. Inquiries encompass the specific vitamin, its prior usage, its effects, the recommended daily dosage, its role, primary nutritional sources, consequences of deficiency, and whether there has been a history of childbirth including neural tube abnormalities or spina bifida.

3.6. Food Consumption Record

In the food consumption record, individuals were asked to write down the amount and types of food for 3 days, including their main meals in the morning, noon, evening, and afternoon, mid-morning and night snacks. Thus, the average of these 3 days was taken and information was obtained about how much of the average daily macro and micronutrients they consumed and their energy intake.

3.7. Food Consumption Frequency

This form was used to calculate the average consumption of foods rich in folic acid, especially to obtain information about the daily, weekly and monthly consumption of foods rich in this vitamin.

The 'MEDAS' scale was employed to assess adherence to the Mediterranean Diet. The Mediterranean Diet Adherence Scale is a questionnaire of 14 items. This questionnaire encompasses the essential oil content utilized in meals by individuals, daily olive oil intake, consumption of fruits and vegetables, intake of solid fats such as margarine or butter, and weekly red meat consumption, along with the frequency of wine, legumes, seafood, nuts, oilseeds, and tomato sauces with olive oil, as well as preferences for white meat over red meat.

3.8. Data Analysis Methods

The data gathered in this study will undergo statistical analysis. Analyses will be conducted utilizing the SPSS (Statistical Package for the Social Sciences) software. The data analysis approach will commence with a summary of the participants' demographic characteristics using descriptive statistics (mean, standard deviation, frequency, and percentage). Data about folic acid awareness and utilization will be exhibited through frequency and percentage distributions, while scores derived from the Mediterranean diet compliance scale will be assessed using descriptive statistics, including mean and standard deviation. The associations between folic acid awareness and usage and demographic variables will be analyzed using adequate parametric and nonparametric tests, including the chi-square test and t-test. Additionally, the correlation between compliance with the Mediterranean diet and folic acid awareness and usage will be assessed through Pearson correlation analysis. Furthermore, multiple regression analysis will be used to assess the impact of folic acid awareness and utilization on adherence to the Mediterranean diet. This analysis will utilize Mediterranean diet compliance scores as the dependent variable, while folic acid awareness, folic acid usage, and demographic characteristics will serve as independent variables. In all statistical analyses conducted, the significance threshold shall be established at $p < 0.05$. The collected data will be processed, anonymised, and utilized solely for research purposes, ensuring the anonymity and privacy of participants are protected.

3.9. Ethics Committee Approval

This thesis study was approved by the unanimous vote of the participants at the Non-Interventional Research Ethics Committee meeting numbered 14, with the application numbered 2024/307 dated 21.08.2024 of the Bezmialem University Ethics Committees Unit.

3.10. Limitations of the Study

- Since it is a study conducted on women working at the BBM (BÜŞRA BEYZA MERT) Polyclinic, we cannot generalize.
- Since it was a study prepared in a short time, the number of people was small.

4. FINDINGS

Table 4.1: Distribution of Sociodemographic Characteristics

		n (%)
Age	18-25 years old	31 (21,5)
	25-35 years old	74 (51,4)
	35-45 years old	39 (27,1)
Marital Status	Married	73 (50,7)
	Single	71 (49,3)
Educational Status	Under high school	1 (0,7)
	High school	34 (23,6)
	Above high school	109 (75,7)
Monthly Income Level	Income is lower than expenses	73 (50,7)
	Income is equal to expense	43 (29,9)
	Income is more than expenses	28 (19,4)
Working Status	Working	117 (81,3)
	Not Working	27 (18,8)
Current pregnancy status	Yes	43 (29,9)
	No	101 (70,1)
Previous pregnancy status	Yes	40 (27,8)
	No	104 (72,2)
Presence of live birth	None	110 (76,4)
	There is	34 (23,6)
Miscarriage or Abortion	None	116 (80,6)
	There is	28 (19,4)
Pregnancy Planning Status (n=65)	Planned	46 (70,8)
	Unplanned	19 (29,2)

When the age groups were examined, it was determined that 21.5% (n=31) of the participants were between the ages of 18-25, 51.4% (n=74) were between the ages of 25-35, and 27.1% (n=39) were between the ages of 18-25.

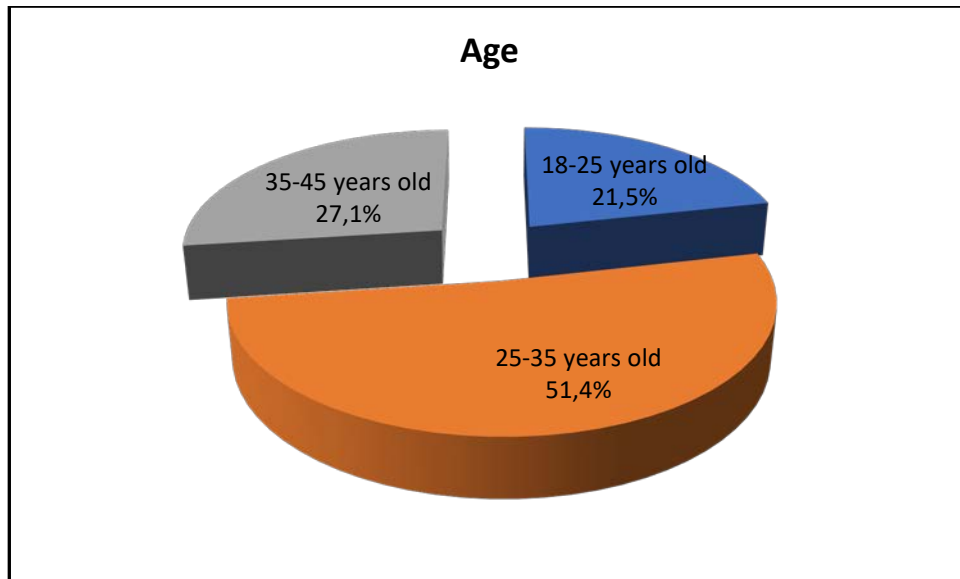


Figure 4.1: Age distribution of participants

50.7% (n=73) of the study participants were married.

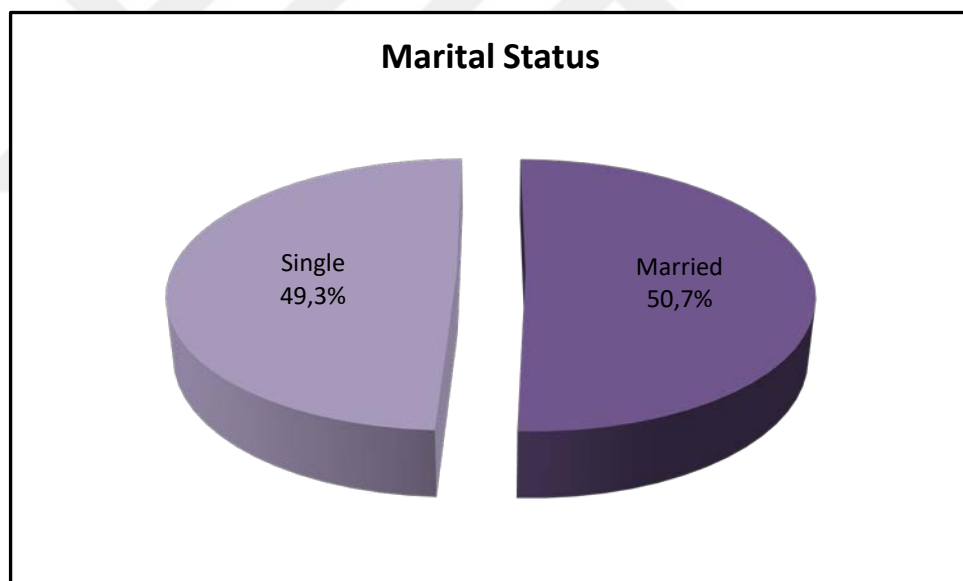


Figure 4.2: Distribution by marital status

While 0.7% (n=1) of the participants had an education level below high school, 23.6% (n=34) had high school and 75.7% (n=109) had above high school.

While the income of 50.7% (n=73) of the participants in the study was lower than their expenses, the income of 29.9% (n=43) was equal to their expenses, and the income of 19.4% (n=28) was greater than their expenses

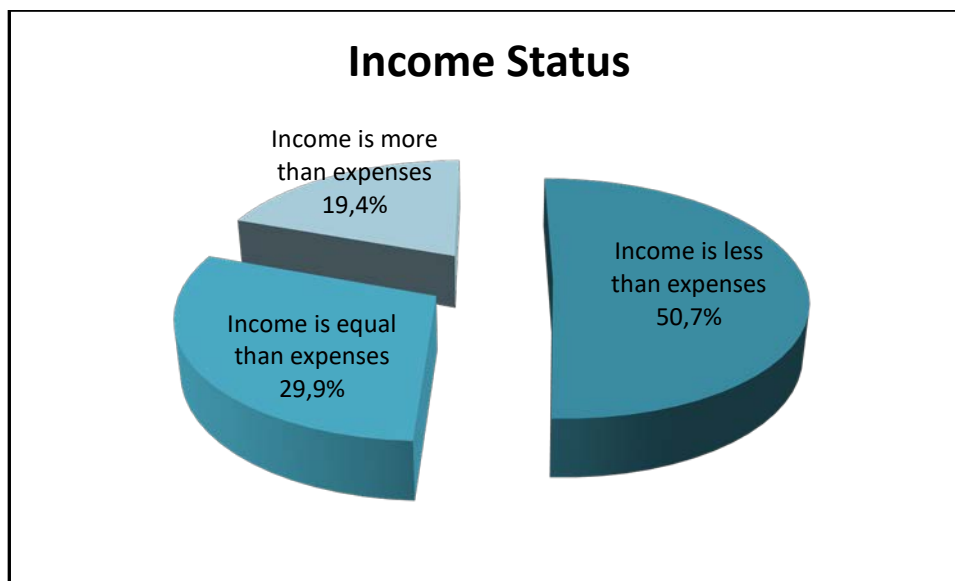


Figure 4.3: Distribution by income level

81.3% (n=117) of the participants were employed.

29.9% (n=43) of the participants currently have a positive pregnancy status. Previous pregnancy was observed in 27.8% (n=40) of the study participants.

Live birth occurred in 23.6% (n=34) of the participants. 19.4% (n=28) of the participants had a miscarriage or abortion.

Of those who became pregnant, 70.8% (n=46) had a planned pregnancy, while 29.2% (n=19) had an unplanned pregnancy.

Table 4.2: Distribution of Responses to Questions on Knowledge of Folic Acid

		n (%)
Have you heard of folic acid before?	Yes	141 (97,9)
	No	3 (2,1)
Which vitamin is folic acid?	B6	29 (20,1)
	B9	63 (43,8)
	I don't know	52 (36,1)
Which food has the highest amount of folic acid?	Liver	26 (18,1)
	Dark green leafy vegetables	60 (41,7)
	Cereal products	36 (25,0)
	Milk and dairy products	22 (15,3)
What is the most important function of folic acid in babies?	They produce red blood cells	56 (38,9)
	They are effective in closing	36 (25,0)

	neural tube defects and brain-spinal cord development.	
	I don't know	52 (36,1)
What is the biggest effect of folic acid deficiency?	Neural tube defects	38 (26,4)
	Anemia	53 (36,8)
	I don't know	53 (36,8)
How much folic acid should an adult woman take daily?	400 mcg	48 (33,3)
	600 mcg	26 (18,1)
	I don't know	70 (48,6)
When should folic acid intake be started to prevent congenital anomalies?	It should be started to be used after pregnancy	51 (35,4)
	It should be started at least 1 month before fertilization and should be used in the first 3 months of pregnancy.	42 (29,2)
	I don't know	51 (35,4)
Do you use folic acid?	Yes	37 (25,7)
	No	107 (74,3)
Did you use a preparation containing folic acid in your previous/current pregnancy? (n=63)	Yes	33 (52,4)
	No	30 (47,6)
If the answer to the previous question is yes, when did you start using it? (n=33)	After I found out I was pregnant	18 (54,5)
	I started using it at least 1 month before fertilization	14 (42,4)
	I didn't use it regularly	1 (3,0)
If your answer to the previous question was no, why did you not use folic acid? (n=30)	Because I don't know	23 (76,7)
	Because I got pregnant unplanned	3 (10,0)
	Because I believe that folic acid needs can be met with a balanced diet.	4 (13,3)
Have you ever given birth to a baby with a neural tube defect / spina bifida?	No	144 (100)

97.9% (n=141) of the study participants had heard of folic acid before.

To the question “Which vitamin is folic acid?” 20.1% (n=29) of the participants answered B6, 43.8% (n=63) answered B9, and 36.1% (n=52) answered “I don’t know.”

To the question “Which food contains the highest amount of folic acid?” 18.1% (n=26) of the participants answered liver, 41.7% (n=60) dark green leafy vegetables, 25% (n=36) cereal products, and 15.3% (n=22) milk and dairy products.

To the question “What is the most important function of folic acid in babies?” 38.9% (n=56) of the participants responded that it produces red blood cells, 25% (n=36) responded that it is effective in the closure of neural tube defects and the development of the brain-spinal cord, and 36.1% (n=52) responded that they do not know.

To the question “What is the biggest effect of folic acid deficiency?” 26.4% (n=38) of the participants responded neural tube defects, 36.8% (n=53) anemia, and 36.8% (n=53) do not know.

To the question “What is the daily folic acid intake required by an adult woman?” 33.3% (n=48) of the participants responded as 400 µg, 18.1% (n=26) as 600 µg, and 48.6% (n=70) as “I don’t know.”

“ When should folic acid intake be started to prevent congenital anomalies? ” 35.4% (n=51) of the participants responded that it should be used after pregnancy, 29.2% (n=42) responded that it should be used at least 1 month before fertilization and should be used in the first 3 months of pregnancy, and 35.4% (n=51) responded that they did not know .

74.3% (n=107) of the study participants use folic acid.

52.4% (n=33) of the participants used folic acid preparations in their previous/current pregnancies. 54.5% (n=18) of those who used folic acid started using it after learning that they were pregnant, 42.4% (n=14) started using it at least 1 month before fertilization, and 3% (n=1) did not use it regularly. 76.7% (n=23) of those who did not use it did not use it because they did not know, 10% (n=3) because they had an unplanned pregnancy, and 13.3% (n=4) because they believed that folic acid needs could be met with a balanced diet.

None of the participants had ever given birth to a baby with a neural tube defect/spina bifida.

Table 4.3: Distribution of True-False Answers to Questions on Knowledge of Folic Acid

	No	Yes
	n (%)	n (%)
Have you heard of folic acid before?	3 (2,1)	141 (97,9)
Which vitamin is folic acid?	81 (56,3)	63 (43,8)
What are the main dietary sources of folic acid?	118 (81,9)	26 (18,1)
What is the most important function of folic acid in babies?	108 (75)	36 (25,0)
What is the biggest effect of folic acid deficiency?	106 (73,6)	38 (26,4)
How much folic acid should an adult woman take daily?	96 (66,7)	48 (33,3)
When should folic acid intake be started to prevent congenital anomalies?	102 (70,8)	42 (29,2)

97.9% of the participants (n=141) answered correctly the question “Have you heard of folic acid before?”

43.8% (n=63) of the participants correctly answered the question "Which vitamin is folic acid?" as "B9".

18.1% (n=26) of the participants correctly answered “Liver” to the question of the main food sources of folic acid.

25% of the participants (n=36) answered correctly the question "What is the most important function of folic acid in babies?"

26.4% (n=38) of the participants answered correctly the question "What is the biggest problem effect of folic acid deficiency?"

Table 4.4: Distribution of Food Consumption Frequencies

	Her gün	Haftada 3-4	15 günde bir	Ayda bir	Hiç
	n (%)	n (%)	n (%)	n (%)	n (%)
Milk and dairy products (Yoghurt, cheese)	61 (42,4)	60 (41,7)	23 (16,0)	0 (0,0)	0 (0,0)
Egg	51 (35,4)	68 (47,2)	21 (14,6)	3 (2,1)	1 (0,7)
Beef Liver	0 (0,0)	8 (5,6)	7 (4,9)	35 (24,3)	94 (65,3)
Other red meats	5 (3,5)	49 (34,0)	83 (57,6)	5 (3,5)	2 (1,4)
White Meat (Chicken, fish)	1 (0,7)	77 (53,5)	57 (39,6)	6 (4,2)	3 (2,1)
K. legumes (Chickpeas, beans)	4 (2,8)	89 (61,8)	39 (27,1)	6 (4,2)	6 (4,2)
Cereals (Wheat, rye)	52 (36,1)	51 (35,4)	33 (22,9)	6 (4,2)	2 (1,4)
Dark green leafy vegetables (Spinach, broccoli, peas)	12 (8,3)	71 (49,3)	56 (38,9)	2 (1,4)	3 (2,1)
Other Vegetables (Eggplant, zucchini, carrot)	7 (4,9)	70 (48,6)	62 (43,1)	2 (1,4)	3 (2,1)
Green fruits (Plum, apple, pear)	6 (4,2)	71 (49,3)	58 (40,3)	9 (6,3)	0 (0,0)
Other fruits (Apricot, blackberry, peach-melon)	8 (5,6)	75 (52,1)	53 (36,8)	7 (4,9)	1 (0,7)
Nuts (Almonds, peanuts)	24 (16,7)	74 (51,4)	40 (27,8)	6 (4,2)	0 (0,0)

When the consumption amounts of milk and dairy products were examined, it was seen that 42.4% (n=61) of the participants consumed them every day, 41.7% (n=60) consumed them 3-4 times a week, and 16% (n=23) consumed them once every 15 days.

When the egg consumption amounts were examined, it was seen that 35.4% (n=51) of the participants consumed them every day, 47.2% (n=68) consumed them 3-4

times a week, 14.6% (n=21) consumed them once every 15 days, 2.1% (n=3) consumed them once a month, and 0.7% (n=1) did not consume them at all.

When the amount of beef liver consumption was examined, it was seen that 5.6% (n=8) of the participants consumed it 3-4 times a week, 4.9% (n=7) once every 15 days, 24.3% (n=35) once a month, and 65.3% (n=94) never consumed it.

When the consumption amounts of other red meats were examined, it was seen that 3.5% (n=5) of the participants consumed it every day, 34% (n=49) consumed it 3-4 times a week, 57.6% (n=83) consumed it once every 15 days, 3.5% (n=5) consumed it once a month, and 1.4% (n=2) did not consume it at all.

When the consumption amounts of white meat were examined, it was seen that 0.7% (n=1) of the participants consumed it every day, 53.5% (n=77) consumed it 3-4 times a week, 39.6% (n=57) consumed it once every 15 days, 4.2% (n=6) consumed it once a month, and 2.1% (n=3) did not consume it at all.

When the consumption amounts of legumes were examined, it was seen that 2.8% (n=4) of the participants consumed them every day, 61.8% (n=89) consumed them 3-4 times a week, 27.1% (n=39) consumed them once every 15 days, 4.2% (n=6) consumed them once a month, and 4.2% (n=6) did not consume them at all.

When the consumption amounts of cereals were examined, it was seen that 36.1% (n=52) of the participants consumed them every day, 35.4% (n=51) consumed them 3-4 times a week, 22.9% (n=33) consumed them once every 15 days, 4.2% (n=6) consumed them once a month, and 1.4% (n=2) did not consume them at all.

When the consumption amounts of dark green leafy vegetables were examined, it was seen that 8.3% (n=12) of the participants consumed them every day, 49.3% (n=71) consumed them 3-4 times a week, 38.9% (n=56) consumed them once every 15 days, 1.4% (n=2) consumed them once a month, and 2.1% (n=3) did not consume them at all.

When the consumption amounts of other vegetables were examined, it was seen that 4.9% (n=7) of the participants consumed them every day, 48.6% (n=70) consumed them 3-4 times a week, 43.1% (n=62) consumed them once every 15 days, 1.4% (n=2) consumed them once a month, and 2.1% (n=3) did not consume them at all.

When the consumption amounts of green fruits were examined, it was seen that 4.2% (n=6) of the participants consumed them every day, 49.3% (n=71) consumed them 3-4 times a week, 40.3% (n=58) consumed them once every 15 days, and 6.3% (n=9) consumed them once a month.

When the consumption amounts of other fruits were examined, it was seen that 5.6% (n=8) of the participants consumed them every day, 52.1% (n=75) consumed them 3-4 times a week, 36.8% (n=53) consumed them once every 15 days, 4.9% (n=9) consumed them once a month, and 0.7% (n=1) did not consume them at all.

When the consumption amounts of nuts were examined, it was seen that 16.7% (n=24) of the participants consumed them every day, 51.4% (n=74) consumed them 3-4 times a week, 27.8% (n=40) consumed them once every 15 days, and 4.2% (n=6) consumed them once a month.

Table 4.5: Distribution of Mediterranean Diet Adherence Level

Mediterranean Diet	<i>Mean±SD</i>	4,70±1,79
Compliance Level	<i>Median (Min-Max)</i>	5 (1-9)
	Low compliance (≤ 5 points)	91 (63,2)
	Medium fit (6-9 points)	53 (36,8)
	High compliance (≥ 10 points)	0 (0,0)

The Mediterranean Diet Compliance scores of the participants in the study ranged from 1 to 9, with the average score being 4.70±1.79. 63.2% (n=91) of the participants had low compliance, while 36.8% (n=53) had medium compliance.

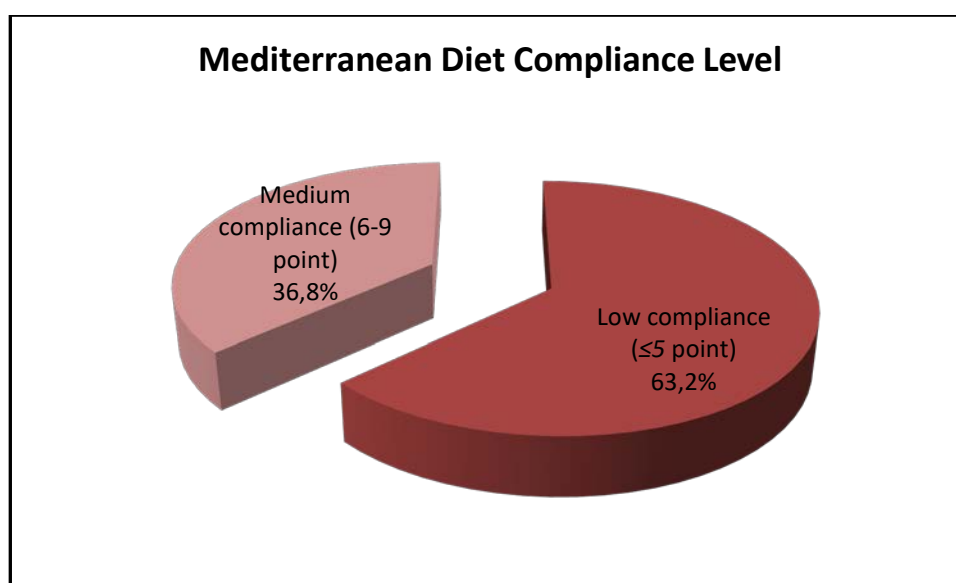
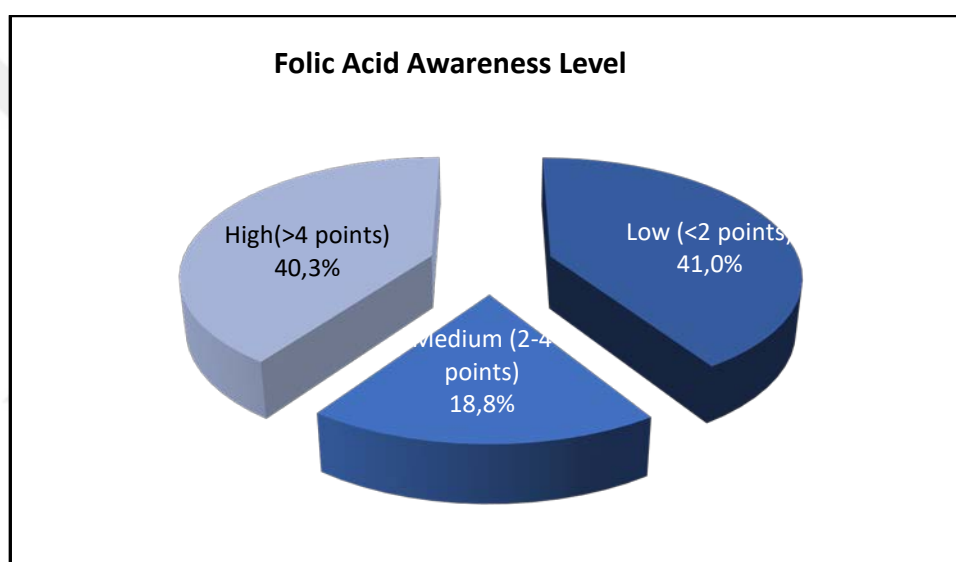


Figure 4.4: Distribution of Mediterranean diet compliance level

Table 4.6: Distribution of Folic Acid Awareness Level

Folic Acid Awareness Level	<i>Mean±SD</i>	39,09±28,62
	<i>Median (Min-Max)</i>	28,5 (0-100)
Low (<2 points)		59 (41,0)
Medium (2-4 points)		27 (18,8)
High (>4 points)		58 (40,3)

Folic acid awareness levels of the participants ranged from 0 to 100, and the average awareness level was determined as 39.09±28.62. 41% (n=59) of the participants had low, 18.8% (n=27) had medium, and 40.3% (n=58) had high levels of folic acid awareness.

**Figure 4.5:** Distribution of folic acid awareness level**Table 4.7:** Relationship between Mediterranean Diet Adherence Level and Folic Acid Awareness Level

		Folic Acid Awareness	
Mediterranean Diet	n		144
Compliance Level	<i>r</i>		0,454
	<i>p</i>		0,001**

A statistically significant moderate correlation was found between the Mediterranean Diet Adherence levels and folic acid awareness of the study participants (as the Mediterranean diet adherence level increases, folic acid awareness increases) ($r=0.454$; $p=0.001$; $p<0.01$).

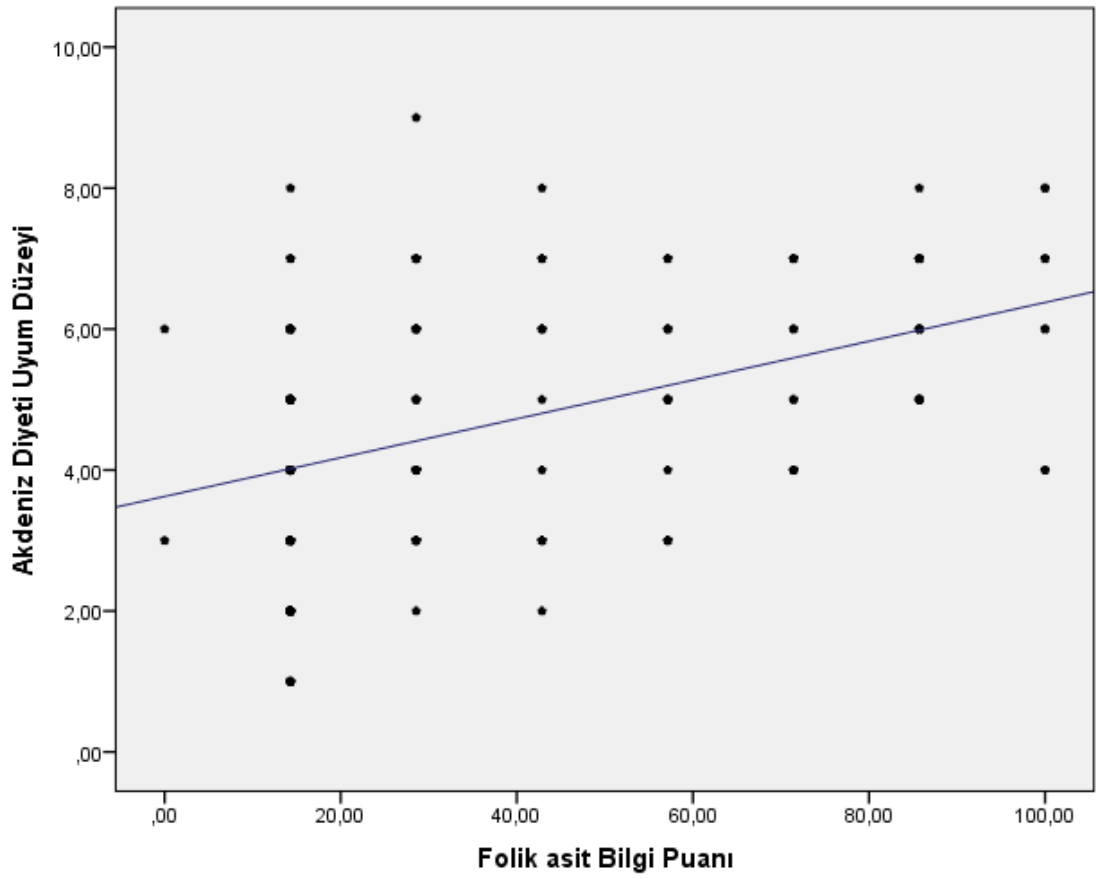


Figure 4.6: Relationship between Mediterranean Diet Adherence Level and Folic Acid Awareness Level

Table 4.8: Mediterranean Diet Adherence Level According to Folic Acid Use

		Folic acid usage status		<i>p</i>
		Yes (n=37)	No (n=107)	
Mediterranean Diet Compliance Level	<i>Mean±SD</i>	6,16±4	4,20±1,70	^a 0,001**
	<i>Median (Min-Max)</i>	6 (4-8)	4 (1-9)	

Mediterranean Diet Adherence Levels of those using folic acid are statistically significantly higher ($p=0.001$; $p<0.01$).

Table 4.9: Evaluation of Folic Acid Awareness Levels According to Demographic Characteristics

		Folic Acid Awareness Level		p
		Mean±SD	Median (Min-Max)	
Age	18-25 years old	36,41±29,47	14,3 (14,3-100)	^a 0,490
	25-35 years old	41,51±29,74	28,6 (14,3-100)	
	35-45 years old	36,63±25,97	28,6 (0-85,7)	
Marital status	Married	47,95±30,15	42,9 (14,3-100)	^b 0,001**
	Single	29,98±23,92	14,3 (0-100)	
Educational Status	High school and below	27,76±20,48	14,3 (0-85,7)	^b 0,008**
	Above high school	42,73±29,96	28,6 (0-100)	
Monthly Income Level	Income is lower than expenses	33,66±26,01	14,3 (14,3-100)	^a 0,042*
	Income is equal to expense	42,86±31,02	28,6 (0-100)	
	Income is more than expenses	47,45±29,37	35,7 (0-100)	
Working Status	It works	39,93±29,33	28,6 (0-100)	^b 0,557
	Doesn't work	35,45±25,48	28,6 (14,3-85,7)	
Current pregnancy status	Yes	56,81±31,56	57,1 (14,3-100)	^b 0,001**
	No	31,54±23,67	14,3 (0-100)	
Previous pregnancy status	Yes	45,36±24,83	42,9 (14,3-100)	^b 0,010*
	No	36,68±29,71	21,4 (0-100)	
Presence of live birth	None	36,10±28,81	28,6 (0-100)	^b 0,003**
	There is	48,74±26,11	42,9 (14,3-100)	
Miscarriage or Abortion	None	36,33±27,97	28,6 (0-100)	^b 0,008**
	There is	50,51±28,96	42,9 (0-100)	
Pregnancy Planning Status (n=65)	Planned	58,07±29,42	57,1 (14,3-100)	^b 0,001**
	Unplanned	30,83±19,79	28,6 (14,3-85,7)	

^aKruskal Wallis Test

^bMann Whitney U Test

*p<0,05

**p<0,01

No statistically significant difference was found between the folic acid knowledge scores of the participants according to their ages (p>0.05).

Folic acid knowledge scores of married individuals were found to be statistically significantly higher (p=0.001; p<0.01).

Folic acid knowledge scores were found to be statistically significantly higher in those with an education level above high school (p=0.008; p<0.01).

Folic acid knowledge scores according to monthly income levels ($p=0.042$; $p<0.05$). As a result of pairwise comparisons made to determine the source of the difference; folic acid knowledge scores of those whose income is higher than their expenses are higher than those whose income is lower than their expenses ($p=0.018$; $p<0.05$).

No statistically significant difference was found between the folic acid knowledge scores of the participants according to their working status ($p>0.05$).

Folic acid knowledge scores of those who were currently pregnant were found to be statistically significantly higher ($p=0.001$; $p<0.01$).

Folic acid knowledge scores of those who had been pregnant before were found to be statistically significantly higher ($p=0.010$; $p<0.05$).

Folic acid knowledge scores of those who had previously given live birth were found to be statistically significantly higher ($p=0.003$; $p<0.01$).

Folic acid knowledge scores of those who had a miscarriage or abortion were found to be statistically significantly higher ($p=0.008$; $p<0.01$).

Among those who were currently or previously pregnant, those with a planned pregnancy had significantly higher folic acid knowledge scores ($p=0.001$; $p<0.01$).

Table 4.10: Evaluation of Food Preferences and Level of Adherence to the Mediterranean Diet

		Mediterranean Diet Compliance Level		p
		<i>Mean±SD</i>	<i>Median (Min-Max)</i>	
Beef Liver	3-4 times a week (n=8)	5,13±1,73	4,5 (3-8)	^a0,261
	Every 15 days (n=7)	5,14±1,77	5 (2-7)	
	Once a month (n=35)	5,09±1,56	5 (2-8)	
	None (n=94)	4,49±1,87	4 (1-9)	
Other red meats	Every day (n=5)	4,80±1,64	4 (3-7)	^a0,775
	3-4 times a week (n=49)	4,78±1,76	5 (1-8)	
	Every 15 days (n=83)	4,69±1,85	5 (1-9)	
	Once a month (n=5)	4,00±1,58	4 (2-6)	
	None (n=2)	5,00±2,83	5 (3-7)	
	Every day (n=1)	3,00±0,00	3 (3-3)	^a0,425

	3-4 times a week (n=77)	4,86±1,70	5 (1-8)	
White Meat	Every 15 days (n=57)	4,65±1,92	5 (1-9)	
(Chicken, fish)	Once a month (n=6)	4,00±1,41	4 (2-6)	
	'None (n=3)	3,67±2,52	4 (1-6)	
Other	Every day (n=7)	5,43±0,79	6 (4-6)	^a 0,016*
Vegetables	3-4 times a week (n=70)	5,06±1,80	5 (1-8)	
(Eggplant,	Every 15 days (n=62)	4,24±1,80	4 (1-9)	
zucchini,	'Once a month (n=2)	3,50±0,71	3,5 (3-4)	
carrot)	'None (n=3)	5,00±1,73	4 (4-7)	
Green fruits	Every day (n=6)	4,83±1,47	4,5 (3-7)	^a 0,095
(Plum, apple,	3-4 times a week (n=71)	5,07±1,88	5 (1-9)	
pear)	Every 15 days (n=58)	4,22±1,73	4 (1-7)	
	Once a month (n=9)	4,78±1,09	5 (3-6)	
Other fruits	Every day (n=8)	5,38±1,19	5 (4-7)	^a 0,037*
(Apricot,	3-4 times a week (n=75)	5,01±1,88	5 (1-9)	
blackberry,	Every 15 days (n=53)	4,13±1,69	4 (1-7)	
peach-melon)	Once a month (n=7)	5,14±1,21	5 (4-7)	
	'None (n=1)	3,00±0,00	3 (3-3)	

'Not included in the comparison due to insufficient number of observations.

^a *Kruskal Wallis Test*

* $p < 0.05$

** $p < 0.01$

A statistically significant difference was found between the Mediterranean Diet Adherence Levels of the participants according to their consumption frequency of other vegetables ($p=0.016$; $p<0.05$). As a result of the pairwise comparisons made to determine the source of the difference; the Mediterranean Diet Adherence Levels of those who consumed other vegetables 3-4 times a week were found to be statistically significantly higher than those who consumed them once every 15 days ($p=0.009$; $p<0.01$).

A statistically significant difference was found between the Mediterranean Diet Adherence Levels of the participants according to their consumption frequency of other fruits ($p=0.037$; $p<0.05$). As a result of the pairwise comparisons made to determine the source of the difference; the Mediterranean Diet Adherence Levels of those who

consumed other fruits 3-4 times a week were found to be statistically significantly higher than those who consumed them once every 15 days ($p=0.009$; $p<0.01$).

There is no statistically significant difference in the Mediterranean Diet Adherence Levels of the participants according to their consumption frequencies of beef lung, other red meat, white meat and green fruits ($p>0.05$).

Table 4.11: Evaluation of Food Preferences with the Level of Adherence to the Mediterranean Diet

		Mediterranean Diet Compliance Level		<i>p</i>
		<i>Mean±SD</i>	<i>Median (Min-Max)</i>	
Milk and dairy products (Yoghurt, cheese)	Every day (n=61)	5,36±1,47	6 (2-8)	<i>c0,001**</i>
	3-4 times a week (n=60)	4,05±1,87	4 (1-9)	
	Every 15 days (n=23)	4,65±1,80	4 (1-8)	
Egg	Every day (n=51)	5,45±1,39	6 (2-8)	<i>c0,001**</i>
	3-4 times a week (n=68)	4,38±1,96	4 (1-9)	
	Every 15 days (n=21)	4,19±1,63	4 (1-7)	
	'Once a month (n=3)	3,33±1,15	4 (2-4)	
	'None (n=1)	3,00±0,00	3 (3-3)	
Legumes (Chickpeas, beans)	'Every day (n=4)	4,00±0,82	4 (3-5)	<i>c0,118</i>
	3-4 times a week (n=89)	4,99±1,79	5 (1-9)	

	Every 15 days		
	(n=39)	4,18±1,93	4 (1-8)
	Once a month		
	(n=6)	4,17±0,75	4 (3-5)
	None (n=6)	4,83±1,47	4,5 (3-7)
Cereals (Wheat, rye)	Every day		^a 0,507
	(n=52)	4,40±1,88	4 (1-8)
	3-4 times a week (n=51)	4,94±1,71	5 (1-9)
	Every 15 days		
	(n=33)	4,73±1,84	5 (1-8)
	Once a month		
	(n=6)	4,83±1,47	4,5 (3-7)
	'None (n=2)	5,50±2,12	5,5 (4-7)
Dark green leafy vegetables (Spinach, broccoli, peas)	Every day		^a 0,041*
	(n=12)	5,17±1,03	5 (4-7)
	3-4 times a week (n=71)	4,99±1,84	5 (1-9)
	Every 15 days		
	(n=56)	4,27±1,81	4 (1-8)
	'Once a month (n=2)	3,00±0,00	3 (3-3)
	'None (n=3)	5,33±1,53	5 (4-7)
Nuts (Almonds, peanuts)	Every day		^a 0,001**
	(n=24)	5,29±1,73	5,5 (2-9)
	3-4 times a week (n=74)	5,16±1,62	5 (1-8)
	Every 15 days		
	(n=40)	3,65±1,63	3,5 (1-8)

'Not included in the comparison due to insufficient number of observations.

^a Kruskal Wallis Test

^c One-way ANOVA Test

* $p < 0.05$

** $p < 0.01$

A statistically significant difference was found between the participants' Mediterranean Diet Adherence Levels according to the frequency of milk and dairy product consumption ($p=0.001$; $p<0.01$). As a result of the pairwise comparisons made to determine the source of the difference; the Mediterranean Diet Adherence Levels of those who consume milk and dairy products every day , was found to be statistically significantly higher than those who consumed 3-4 days a week ($p=0.001$; $p<0.01$).

A statistically significant difference was found between the participants' Mediterranean Diet Adherence Levels according to their egg consumption frequency ($p=0.001$; $p<0.01$). As a result of pairwise comparisons made to determine the source of the difference; the Mediterranean Diet Adherence Levels of those who consumed eggs every day were found to be statistically significantly higher than those who consumed eggs 3-4 days a week and once every 15 days ($p=0.003$; $p=0.017$; $p<0.05$).

A statistically significant difference was found between the Mediterranean Diet Adherence Levels of the participants according to their frequency of consuming dark green leafy vegetables ($p=0.041$; $p<0.05$). As a result of the pairwise comparisons made to determine the source of the difference; the Mediterranean Diet Adherence Levels of those who consumed dark green leafy vegetables 3-4 days a week were found to be statistically significantly higher than those who consumed them once every 15 days ($p=0.019$; $p<0.05$).

A statistically significant difference was found between the Mediterranean Diet Adherence Levels of the participants according to their nut consumption frequency ($p=0.001$; $p<0.01$). As a result of the pairwise comparisons made to determine the source of the difference; the Mediterranean Diet Adherence Levels of those who consumed nuts every day and those who consumed them 3-4 times a week were found to be statistically significantly higher than those who consumed them every 15 days ($p=0.001$; $p=0.001$; $p<0.01$).

There is no statistically significant difference in the Mediterranean Diet Adherence Levels of the participants according to their consumption frequency of legumes and cereals ($p>0.05$).

Table 4.12: Evaluations According to Folic Acid Usage Status

		Folic acid usage status		<i>p</i>
		Yes	No	
Education	High school and below	5 (14,3)	30 (85,7)	^d 0,076
Status	Above high school	32 (29,4)	77 (70,6)	
Marital status	Married	34 (46,6)	39 (53,4)	^d 0,001**
	Single	3 (4,2)	68 (95,8)	
Monthly income level	Income is lower than expenses	16 (21,9)	57 (78,1)	^d 0,568
	Income is equal to expense	13 (30,2)	30 (69,8)	
	Income is more than expenses	8 (28,6)	20 (71,4)	

^dChi-Square Test***p*<0,01

The rate of folic acid use among married individuals was statistically significantly higher than among single individuals (*p*=0.001; *p*<0.01).

Table 4.13: Linear Regression Analysis in Examining the Factors Affecting Folic Acid Awareness Level

	Std Coeff		95% CI	
	Beta	<i>p</i>	Lower	Upper
Still		0,855	-72,311	60,201
Marital status	0,063	0,623	-23,285	38,555
Education Status	0,175	0,235	-7,726	30,833
Monthly income level	0,081	0,553	-7,413	13,689
Current pregnancy status	-0,158	0,327	-30,199	10,236
Previous pregnancy status	0,187	0,368	-13,772	36,552
Presence of live birth	0,078	0,690	-18,344	27,519
Number of miscarriages or abortions	0,142	0,274	-6,884	23,816
Pregnancy planning status	0,314	0,014*	4,377	37,175

Dependent variable: Folic acid awareness level

**p*<0.05

Linear regression analysis was performed to determine the risk factors affecting folic acid awareness. Demographic variables that had a significant or near-significant ($p < 0.200$) relationship with folic acid awareness level were included in the analysis.

The explanatory coefficient of the model was 29.2% and the model was found to be statistically significant ($p = 0.012$; $p < 0.05$). The folic acid awareness scores of the participants with planned pregnancies were 0.314 times (95% CI: 4.377-27.175) higher than those with unplanned pregnancies ($p = 0.014$; $p < 0.05$).

Table 4.14: What Percentage of Folic Acid Amount is Required?

	Mean $\pm$ SD	Median (Min-Max)
What percentage of the folic acid intake is met?	0,54 $\pm$ 0,20	0,5 (0,2-1,4)

Participants in the study met an average of 54% of the folic acid they needed from the foods they consumed.

5. DISCUSSION

This study aimed to investigate the correlation between the awareness and utilization of folic acid among female personnel and clients of reproductive age at BBM (BÜŞRA BEYZA MERT) Polyclinic and the Mediterranean Diet.

Upon examining the educational status of the study participants, it was noted that 75.7% possessed a high school diploma. Data from TNSA (Türkiye Nüfus ve Sağlık Araştırmaları) 2018 indicated that the average year of education was 8 years, corresponding to the secondary school level, which was determined to be inferior to that reported in the study.

The demographic profiles and levels of knowledge on folic acid were analyzed. The awareness level of folic acid among participants who were previously or currently pregnant was substantially greater than that of people who were not pregnant. Çınar and colleagues The understanding and utilization of folic acid among pregnant women were shown to be elevated and more prevalent. Upon examining the correlation between educational attainment and income levels, it was noted that an increase in these factors corresponded with a rise in knowledge levels. A study in Denizli province revealed that higher level of education correlates with improved understanding of folic acid (78). The findings indicated that the results of the current study supported one another.

Previous studies in Turkey indicated that 15% of women accurately identified folic acid, however this study revealed a rate of 43.8%. Upon evaluating the percentage of individuals aware of the role of folic acid in the body, it was noted that the findings of the prior study were consistent with those of the new study. While other research accurately identified the most significant consequence of folic acid deficiency at 69.6%, this study revealed a reduction to 26.4%. In the examination of non-pregnant individuals, 74.3% did not utilize folic acid, a decrease from the 57.2% reported in the last study, indicating a reduction in usage. Upon examining the accurate value of the daily dose, this rate was established at 17.9%, however our study determined it to be 33.3%. The results indicate that, despite individuals being aware of the correct amount to take, there is an odd rise in the lack of understanding of the functional qualities of the supplements, suggesting that users are unaware of the purpose of the supplements they use (40).

In a study conducted in Tokat province in 2022, a cross-sectional study was conducted on folic acid use and knowledge levels in pregnant women during the preconception period. As a result of this study, folic acid use during the preconception period was determined as 17.7%. The highest use was seen in those who received doctor information in the first trimester. The knowledge level was high in those who received care and counseling during the preconception period. The reason why these rates were lower than in our study is thought to be due to the difference in socio-demographic characteristics and low access to health services (79). A further study in Ankara revealed that pre-pregnancy usage was noted in merely 30,7% of participants (80). The study revealed that the usage of folic acid supplements predominantly occurred after the onset of pregnancy (81). The prevalent use during the preconception period is attributed to inadequate training and counseling regarding awareness and consciousness during this time.

The survey conducted to assess food consumption frequency involved examinations of the identified foods. The food consumption frequency survey was specifically designed to assess folic acid intake, focusing on foods that are rich in this nutrient. The table indicates that dairy products were the most frequently consumed food group daily, while beef liver was the least consumed. Within the meat-egg-legume group, egg consumption was observed to be the highest daily intake at 35.4%. TBSA (Türkiye Beslenme ve Sağlık Araştırmaları) 2017 data indicates that these rates were established at 42.5%. Upon examining the consumption frequency of 3-4 days per week, it was found that white meat had the highest rate at 53.5%. The TBSA(Türkiye Beslenme ve Sağlık Araştırmaları) determined this rate to be 4.5%. The increase in chicken meat consumption is attributed to the rising prices of red meat over the years and a decrease in purchasing opportunities. Legume consumption analysis reveals that intake peaks at 3-4 days per week, whereas data from TBSA (Türkiye Beslenme ve Sağlık Araştırmaları) indicates a higher frequency of 2-3 days per week.

Analysis of dairy product consumption reveals a daily frequency of intake. TBSA(Türkiye Beslenme ve Sağlık Araştırmaları) data indicates that yogurt is the most consumed food item at 90.5%, followed by cheese at 79.2%. The table indicates that the rates are mutually supportive, as the consumption of yogurt and cheese is specifically addressed.

The vegetable group is categorized into green leafy vegetables and other vegetables based on their folic acid content. The table indicates that DGLVs vegetable consumption occurs most frequently 3-4 days a week, whereas TBSA(Türkiye Beslenme ve Sağlık Araştırmaları) data show that daily consumption is the highest. This indicates a reduction in vegetable consumption among individuals. Consumption of vegetables 3-4 days a week is relatively high; however, it is noted that the most prevalent frequency in TBSA(Türkiye Beslenme ve Sağlık Araştırmaları) is once a week. This result indicates a shift in people's preferences from DGLVs vegetables to alternative vegetable options.

The MEDAS (Mediterranean Diet Adherence Scale) scale was utilized to assess adherence to the Mediterranean Diet. The MEDAS scores were measured at 4.70 ± 1.79 . The participants' compliance rates were determined to be 63.1%. The study by Buse et al. reported a compliance of 6.6 ± 2.33 (82). A moderate level of compliance was observed according to this outcome. This may be attributed to the variations in education and income levels among the study participants. It is believed that this may be attributed to the decline in food quality throughout time. The assessment of adherence to the Mediterranean Diet based on participants' food preferences revealed that individuals who consumed eggs, dairy products, dark green leafy vegetables, nuts, and fruits 3-4 times per week exhibited significantly higher compliance than those who consumed these items once every 15 days. The reason for this is that the foods listed in the food consumption frequency encompass those found in the Mediterranean diet model, and adherence is anticipated to rise when the intake of these foods increases among individuals. Upon assessing folic acid awareness, it was shown that 41% of participants exhibited low awareness, whereas 40.3% had good awareness. The correlation between the Mediterranean Diet and levels of Folic Acid Awareness was analyzed regarding the proximity of these rates. The examination revealed a positive connection. It was shown that an increase in compliance with the Mediterranean diet corresponded with heightened awareness of folic acid. In a study, the Mediterranean diet was examined in relation to fetal parameters. According to this study, as adherence to the Mediterranean diet increased, better fetal development was observed, and it was found to be positively associated with plasma folate and vitamin B12 levels. It was also observed that babies born to individuals with low adherence to the diet had lower birth weights. (83).

Upon evaluating folic acid usage, it was noted that married participants had a higher prevalence than their single counterparts. This is believed to be attributable to married women either planning to conceive or having previously become pregnant.

Linear regression study revealed that awareness levels of folic acid were greater among individuals with intended pregnancies compared to those with unplanned pregnancies. A study determined that the prevalence of folic acid utilization throughout the preconceptional phase was 16% in intended pregnancies. No utility was detected in the alternative group. It is believed that knowledge levels are elevated in planned pregnancies since gynecological examinations commence before to conception, accompanied by information regarding folic acid (84).

To ascertain if daily folic acid requirements are fulfilled, three-day food consumption data were collected, and the average daily folic acid intake was computed. These values were contrasted with the prescribed daily dosage. This study revealed that individuals can fulfill 54% of their daily folic acid requirements through eating.). A separate study conducted in America revealed that individuals obtain 28.75% of their daily average folic acid consumption from food sources (85). Studies conducted in Turkey suggest that the elevated value is attributed to increased consumption of foods high in folic acid.

6. CONCLUSION

This study at the BBM (BÜŞRA BEYZA MERT) Polyclinic assessed the awareness, utilization, and compliance levels of folic acid among female personnel and clients of childbearing age, while also investigating the correlation between these factors. The results derived from the study can be summarized as follows:

1. *Educational Attainment and Knowledge Proficiency:* The level of education significantly influenced awareness and utilization of folic acid. With the elevation in educational attainment, there was a corresponding enhancement in knowledge regarding folic acid. These findings align with analogous studies in the literature and demonstrate that enhancing individuals' educational attainment is crucial in fostering awareness.
2. *Awareness and Utilization of Folic Acid:* Participants' understanding of folic acid improved relative to prior studies; however, a decline was noted in their awareness of its useful qualities. This condition indicates that while individuals may utilize folic acid supplements at appropriate dosages, their awareness remains inadequate. Furthermore, it was established that the utilization rates of folic acid among married individuals with intended pregnancies are elevated.
3. *Level of Adherence to the Mediterranean Diet:* The adherence level to the Mediterranean Diet, evaluated using the MEDAS (Mediterranean Diet Adherence Scale) scale, was predominantly low. It was noted that folic acid consumption and awareness were elevated among those following the Mediterranean Diet, leading to the conclusion that this dietary paradigm may significantly enhance folic acid awareness.
4. *Frequency of Dietary Intake:* Upon examining the intake of folic acid-rich meals, it was found that the frequency of green leafy vegetable consumption declined, while the consumption of dairy products and white meat increased. This circumstance was linked to economic variables and individual dietary preferences.
5. *Daily Folic Acid Consumption:* Participants were found to meet only 54% of their daily folic acid requirements from food sources. This rate was seen to be elevated in prior research conducted in Turkey, and it was posited that the decline in food quality and economic access limitations led to this situation.

7. SUGGESTIONS

This study's findings yield the following recommendations to enhance knowledge of folic acid at both individual and societal levels and to promote adherence to the Mediterranean Diet:

1. Educational and Informational Programs:

- Educational programs ought to be implemented to enhance awareness of folic acid among women. These trainings should specifically focus on women who are either considering a pregnancy or are of childbearing age. The significance of the Mediterranean Diet on health and the necessity of foods abundant in folic acid should be highlighted.

2. Enhancing Health Policies:

- Health institutions should offer comprehensive nutrition consultations, including guidance on folic acid and the Mediterranean Diet.
- Health policies must be formulated to enhance folic acid utilization, particularly during the preconception phase, and complimentary consultation and supplementation should be offered to women throughout this period.

3. Economic Accessibility and Nutritional Quality:

- Food costs must be regulated, and incentives for local production should be established to enhance access to foods abundant in folic acid.
- Food policies must be enacted to enhance nutrient quality, and access to high-quality food for individuals should be facilitated.

4. Community-Centric Initiatives:

- Initiatives must be implemented at the local level to enhance adherence to the Mediterranean Diet. Healthy food workshops may be conducted in public educational institutions.
- Public awareness programs must be initiated to avert folic acid deficiency, with particular emphasis on social media information initiatives targeting young women.

5. *Investigative and Surveillance Studies:*

- Comprehensive research encompassing various age demographics are essential to enhance adherence to the Mediterranean Diet and understanding of folic acid.

- Regular studies must be undertaken to assess variations in food intake frequency, and new strategies should be formulated based on the data acquired from these investigations.

These guidelines can facilitate the implementation of effective measures at both individual and community levels to avert folic acid deficiency and promote wider acceptance of the Mediterranean Diet.



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9. APPENDICES

9.1. Questionnaire Form

This research was planned to determine the " Knowledge Level and Use of Folic Acid and Compliance with the Mediterranean Diet among Women of Childbearing Age". In order for the study to achieve its purpose, you are asked to: answer all questions completely, without being under pressure or suggestion from anyone, and sincerely answer the answers that are most appropriate for you. Reading and approving this form means that you agree to participate in the study. The data to be obtained from you in the study will be kept confidential, but will be reviewed by the officers who monitor the quality of the study, ethics committees or official authorities if necessary

General Information

1) Age:

a) 18-25

b) 25-35

c) 35-45

2) Marital Status:

a) Married

b) Single

3) Education Status:

a) Below High School

b) High School

c) Above High School

4) Monthly Income Level:

a) Income is lower than expenses

b) Income is equal to expenses

c) Income is more than expenses

5) Occupation: Working status:

a) Working

b) Not working

Information About Pregnancy Status

6) Are you currently pregnant?

a) Yes

b) No

7) Have you been pregnant before? If so, how many times?

a) Yes

b) No

8) Number of live births

a) 0

b) 1

c) 2

d) 3 and above

9) Number of miscarriages or abortions:

- a) 0
- b) 1
- c) 2 and above

10) Pregnancy planning status:

- a) Planned
- b) Unplanned

Information about Folic Acid

11) Have you heard of folic acid before?

- a) Yes
- b) No

12) Which vitamin is folic acid?

- a) B6
- b) B9
- c) I don't know

13) What are the main food sources of folic acid?

- a) Liver
- b) Dark green leafy vegetables
- c) Cereal products
- d) Milk and dairy products

14) What is the most important function of folic acid in babies?

- a) They produce red blood cells
- b) They are effective in the closure of neural tube defects and the development of the brain and spinal cord
- c) I don't know

15) What is the biggest effect of folic acid deficiency?

- a) Neural tube defects
- b) Anemia
- c) I don't know

16) What is the daily folic acid intake for an adult woman?

- a) 400 mcg.
- b) 600 mcg.
- c) I don't know

17) When should folic acid intake be started to prevent congenital anomalies?

- a) It should be started after conception.
- b) It should be started at least 1 month before fertilization and should be used in the first 3 months of pregnancy.
- c) I don't know

18) Folic acid intake status of non-pregnant women:

- a) Yes
- b) No

19) Did you use a preparation containing folic acid in your previous/current pregnancy?

a) Yes

b) No

20) If the answer to question 19 is yes, when did you start using it?

a) After I learned that I was pregnant

b) I started using it at least 1 month before fertilization

c) I did not use it regularly.

21) If your answer to question 19 is no, why did you not use folic acid?

a) Because I did not know

b) Because I had an unplanned pregnancy

c) Because I believe that folic acid needs are met with a balanced diet

22) Have you ever given birth to a baby with a neural tube defect / spina bifida?

a) Yes

b) No

Food Consumption Frequency

Please indicate how often you consume the following foods..

Foods	Food Consumption Frequency				
	Everyday	3-4 times a week	15 days a day	Once a month	Never
Milk and dairy products (cheese, yogurt)					
Egg					
Beef Liver					
Other Red meat					
White meat (Chicken, fish)					
Black-eyed peas					
Legumes					
Grains (rice, wheat, rye)					
DGVLs (Spinach, broccoli, peas)					
Other vegetables (eggplant, zucchini, carrot)					
Green Fruits (plum, apple, pear)					
Other fruits (apricot, blackberry, peach, melon)					
Nuts (almond, peanut)					

Food Consumption Record

Write the foods you have consumed in 3 days in the form in the table below in the blank area. You can use the information below to easily determine the portions.

- 1 serving of cheese = 2 fingers thick
- 1 slice of bread = 1 palm (25 gr.)
- 1 serving of meat products = 1 palm
- 1 serving of fruit = 1 palm
- 1 serving of vegetables = 2 palms
- 1 portion of grain products = 1 fist
- 1 cup = 200 mL.
- 1 tablespoon = 15 gr.
- 1 dessert spoon = 5 gr.
- 1 medium bowl = 200 gr.

** This is a table for 1 day's food consumption. It must be filled 3 times.

** Write your 3-day food consumption record in the blank areas below.

MEALS	FOODS	PORTION	INGREDIENTS	MEASUREMENTS
BREAKFAST Time:	-			
SNACK Time:				
LUNCH Time:				
SNACK Time:				
DINNER Time:				
SNACK Time:				

Mediterranean Diet Adherence Scale

1. Do you use olive oil as a primary oil in your meals?
 - a) Yes
 - b) No
2. How much olive oil do you consume per day? (Fried food, salad, meals eaten outside the home, etc.) (1 tablespoon = 13.5 gr.)
3. How many servings of vegetables do you consume per day? (1 serving = 200 gr.)
4. How many servings of fruit do you consume per day? (1 serving = 80 gr.)
5. How many servings of meat do you consume per day? (1 serving = 100-150 gr.)
6. How many servings of butter or margarine do you consume per day? (1 tablespoon = 12 gr.)
7. How much sugary or sweetened beverages do you consume per day? (1 serving = 100 mL.)
8. Do you drink wine? How much do you consume per week? (1 glass = 125 mL.)
9. How many servings of legumes do you consume per week? (1 portion = 150 g.)
10. How many portions of fish/seafood do you consume per week? (1 portion = 100-150 g.)
11. How many times a week do you consume processed desserts or pastries (not homemade)?
12. How many times a week do you consume nuts (hazelnuts, peanuts)? (1 portion = 30 g.)
13. Do you prefer to eat chicken, turkey or rabbit meat instead of beef, pork, hamburger or sausage?

14. How many times a week do you use olive oil with tomato, garlic, onion or leek sauce on boiled vegetables, pasta, rice or other dishes?



9.2. Curriculum Vitae

Personal Information

Name	Yasmin	Surname	MENGÜLLÜOĞLU
Place of Birth		Date of Birth	
Nationality		ID number	
E-mail		Phone	

Education Status

Degree	Area	Name of the Institution Graduated	Graduation Year
Postgraduate			
Master			
Bachelor			
High School			

Known Foreign Languages	Foreign Language Exam Grade(#)

Görevi	Kurum	Süre (Yıl - Yıl)

Compture Knowledge

Program	Kullanma becerisi

Scientific Studies, Articles published in journals included in

SCI, SSCI, AHCI indexes

Articles published in other journals

Papers presented at international scientific meetings and published in the proceedings book (Proceedings)

9.3. Ethics Committee Approval Form

	T.C. BEZMİALEM VAKIF ÜNİVERSİTESİ REKTÖRLÜĞÜ Teknoloji Transfer Ofisi	
Sayı : E-54022451-050.04-164034 Konu : 2024/327 Etik Kurul Kararı		06.09.2024
Sayın Doç. Dr. Hülya DEMİR Yeditepe Üniversitesi- Beslenme ve Diyetetik		
2024/327 numaralı "Doğurganlık Çağındaki Kadınlarda Folik Asit Farkındalığı ve Kullanımının Akdeniz Diyeti ile İlişkisi" başlıklı başvurunuz Üniversitemiz Etik Kurullar Birimi'nin 21.08.2024 tarihli, 14 sayılı Girişimsel Olmayan Araştırmalar Etik Kurul toplantısında değerlendirilmiş olup, mevcudun oy birliğiyle onaylanmasına karar verilmiştir.		
Bilgilerinizi ve gereğini arz/rica ederim.		
Prof.Dr. Hayrettin ÖZTÜRK Girişimsel Olmayan Araştırmalar Etik Kurulu Başkanı		
Bu belge, güvenli elektronik imza ile imzalanmıştır.		
Doğrulama Kodu :BSMBBNK1AP Pin Kodu :31372 Belge Takip Adresi : https://turkiye.gov.tr/ebd?eK=5394&eD=BSMBBNK1AP&eS=164034		
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Bilgi için: Enes KAMACI Unvan: Etik Kurul Sekreteri		