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ARAŞTIRMA / RESEARCH

Effect of folic acid supplementation on mental health in the antenatal and postnatal period

Folik asit takviyesinin antenatal ve postnatal dönemde ruh sağlığına etkisi

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Abstract

Purpose: The aim of the study was to examine the mental health outcomes of folic acid (FA) supplement use in the antenatal and postnatal periods.
Materials and Methods: This descriptive-prospective longitudinal study was conducted between 1 December 2019 and 30 January 2021 in a Family Health Center in eastern Turkey. The study was performed at one week in the postpartum period, at 6-8 weeks in the postpartum period, and at six months in the postpartum period. A total of 162 healthy pregnant women were included in the study. A Personal Information Form, the Beck Anxiety Inventory (BAI), and the Edinburgh Postpartum Depression Scale (EPDS) were used to collect data.
Results: While 32.7% (n=53) of the participants used FA supplementation from the pre-pregnancy period and in the first trimester of pregnancy (6 months in total), and 34.6% (n=56) used FA supplementation only in the first trimester of pregnancy. It was determined that 32.7% (n=53) of the participants did not use any FA supplement. Of those who did not use FA, 37.0% were in the antenatal period, and 50.8% were on the postnatal 6-8 days. It was determined that the participants experienced mild/moderate/severe anxiety in different weeks. BAI and EPDS scores were the lowest in the prenatal period, at 6-8 weeks in the postpartum period, and at 6 months in the postpartum period in those who used FA supplementation for 6 months. BAI and EPDS scores decreased significantly from the antenatal, to the postnatal 6-8-week, and to the postnatal 6-month measurements.
Conclusion: The use of FA supplements can be effective in preventing symptoms of anxiety and depression in the antenatal and postnatal period.
Keywords: Folic acid, pregnancy, postnatal, anxiety, depression

Öz

Amaç: Çalışmanın amacı folik asit takviyesi kullanımının antenatal ve postnatal dönemde ruh sağlığına etkisini incelemek.
Gereç ve Yöntem: Tanımlayıcı-prospektif boylamsal tipte olan çalışma, 1 Aralık 2019-30 Ocak 2021 tarihleri arasında Türkiye'nin doğusundaki bir Aile Sağlığı Merkezinde yapıldı. Çalışma gebelikte, doğum sonrası 6-8. hafta ve doğum sonrası 6. ay olmak üzere üç aşamada tamamlandı. Çalışmaya toplam 162 sağlıklı gebe dahil edildi. Verilerin toplanmasında Kişisel Bilgi Formu, Beck Anksiyete Envanteri (BAI) ve Edinburgh Doğum Sonrası Depresyon Ölçeği (EPDS) kullanıldı.
Bulgular: Katılımcıların %32.7'si (n=53) gebelik öncesi dönemden başlayıp gebeliğin ilk trimesterinde de (6 ay) FA takviyesi kullanmış ve %34.6'sı (n=56) FA takviyesini sadece gebeliğin ilk trimesterinde kullanmıştır. Katılımcıların %32.7'sinin (n=53) herhangi bir FA takviyesi kullanmadığı belirlendi. FA kullanmayanların %37.0'I antenatal dönemde, %50.8'i postnatal 6-8. haftalarda hafif/orta/şiddetli düzeyde anksiyete yaşadığı belirlendi. 6 ay süreyle FA takviyesi kullananlarda doğum öncesi, doğum sonrası 6-8 hafta ve doğum sonrası 6 ayda BAI ve EPDS puanları en düşüktü. BAI ve EPDS puanlarının antenatal, postnatal 6-8 hafta ve postnatal 6. ayda istatistiksel olarak azaldığı belirlendi.
Sonuç: Araştırma bulguları, antenatal ve postnatal dönemde FA takviyesi kullanımının anksiyete ve depresyon belirtilerini önlemede etkili olabileceğini ortaya koymuştur.
Anahtar kelimeler: Folik asit, gebelik, postnatal, anksiyete, depresyon

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INTRODUCTION

The World Health Organization (WHO) recommends folic acid (FA) supplementation for women in the periconceptional period to reduce the risk of neural tube defects (NTDs)[1]. To prevent folate-sensitive NTDs, women of reproductive age are recommended to consume folate-rich foods and 400 μg synthetic FA every day[2, 3]. Nutritional folate consumption is not sufficient to reduce the risk of NTDs, and thus, in many countries, women are advised to take FA supplements in the 3 months before conception and the first 12 weeks of pregnancy[4, 5]. As in many countries in the world, the Ministry of Health in Turkey also makes the same recommendation for women who are planning to get pregnant. Despite this, studies conducted in Turkey have reported the usage rates of FA supplements between 3% and 25%[6-8].

Studies on FA have also shown that folate deficiency could have a causal relationship to depressive symptoms. This is because folate is required for the biosynthesis of monoamine neurotransmitters (e.g., serotonin, dopamine, norepinephrine). Depending on the role of folate in the mechanism of depression, inadequate folate/FA intake in pregnancy may lead to psychological problems[9]. Previous studies have found the risk of depressive symptoms lower in those who use FA in the antenatal period[9-11]. Moreover, some studies have reported that high levels of folate supplementation have a protective effect against depressive symptoms[12,13]. Lewis et al. found that women who took FA supplements in the antenatal period had lower depression scores 21 months after childbirth in comparison to those who did not take FA supplements[14].

Depression and anxiety are the most frequently encountered mental health problems in the antenatal or postnatal period and are among the leading causes of maternal morbidity and mortality worldwide[15-17]. In a meta-analysis conducted in 2017 on 66 studies in 25 countries including Turkey, the prevalence of anxiety symptoms and mild-severe depressive symptoms together in pregnancy was determined as 9.5%[18]. Postpartum depression rates vary between 12.5% and 58%[19]. Anxiety and depression experienced in the antenatal and postnatal periods increase complications in labor, may lead to preterm labor, low birth weight, and intrauterine growth delay, and can affect the health of the newborn negatively. Therefore, preventing perinatal anxiety and depression is important not only for the mother but also for family and newborn health[20].

Using FA in the periconceptional period and continuing to use it the antenatal period is necessary for the development of maternal and fetal health, as well as being important for preventing psychological issues in the woman. The review of the relevant literature in this study did not reveal any previous study on the relationship between FA use and anxiety and depression in the antenatal and postnatal periods. In this study, it was aimed to investigate the use of FA supplementation and its effects on anxiety and depression in the antenatal and postnatal periods.

MATERIALS AND METHODS

Design

This descriptive-prospective longitudinal study was conducted between1 December 2019 and 30 January 2021 at a Family Health Center (FHC) located in eastern Turkey. In Turkey, an FHC is an institution where family medicine services are provided by health personnel including physicians (family physicians or specialists), midwives, nurses, health officers, and medical secretaries. Pregnancy and postpartum follow-ups are also carried out at these institutions. Throughout their pregnancy, women can get procedures such as physical examinations, laboratory tests, and vaccinations performed, and they can receive information from these institutions about issues like pregnancy-related complaints and breastfeeding. In the postpartum period, the care and follow-ups of the mother and her baby also continue at these institutions. These care and follow-up procedures include laboratory tests, education, and counseling for the mother and heel prick tests, developmental follow-ups, and vaccination programs for the baby.

To conduct the study, ethical approval was obtained from the University's Health Sciences Scientific Research and Publications Ethics Committee (Decision: 2019/23-26), and written permission was received from the institution where the study would be conducted. In this study, the principles of the Declaration of Helsinki were complied with and the study was carried out in accordance with these principles. Before starting the study, all participants provided written consent. Throughout the study, all

participants were informed that they could leave the study any time they wanted. To protect the privacy of the participants, codes were assigned to their data, and the collected data were used only for the purposes of this study.

Sample

The population of this study consisted of pregnant women who were registered with the aforementioned FHC. The women to be included in the sample were determined by random sampling from this population. The appropriate sample size was calculated by power analysis using the OpenEpi version 3.0 statistics software (http://www.openepi.com). Assuming that the rate of FA usage in pregnancy was 12%[6], with a 5% error margin, 95% confidence interval, 80% power, and two-tailed significance, the minimum required sample size was determined as 162. The sample included 162 healthy pregnant women who voluntarily agreed to participate in the study by filling out the informed consent form. The inclusion criteria were not having a communication problem, being 18 years old or older, being in the 2nd or 3rd trimester, and not having a risky pregnancy (e.g., bleeding, risk of miscarriage, heart disease). The exclusion criteria were having a history of psychiatric disease or using psychiatric medication based on medical records.

Data collection

The data were collected by the researchers in three stages using the face-to-face interview method, and each questionnaire was filled in approximately 20 minutes. The first data collection stage took place in the antenatal period. A personal information form, the Beck Anxiety Inventory (BAI), and the Edinburgh Postnatal Depression Scale (EPDS) were administered to the participants who presented to the FHC for their pregnancy follow-ups. The participants were given codes instead of their names to protect their privacy. The second stage took place in the 6th-8th postnatal weeks, while the third stage took place in the 6th postnatal month. The participants were invited to the FHC for the second and third stages, and they filled out BAI and EPDS again. As there were participants who left the study for various reasons (e.g., address change, moving to another city, choosing to withdraw from the study) at the second stage, the forms were administered to 148 participants. Because 5 participants could not be reached at the third stage, the study was completed with 143 participants in total (Figure 1).

Measures

Personal Information Form

The Personal Information Form was prepared by the researchers. This form included questions on the participants' sociodemographic characteristics (e.g., age, education level, employment status, income level) and awareness of FA use (e.g., having information about FA use, level of knowledge about FA)[9,16] and includes a total of 14 questions.

Beck Anxiety Inventory

BAI was developed by Beck et al. (1988) and tested for validity and reliability in Turkish by Ulusoy et al. (1998). It allows the determination of the anxiety levels of individuals. It is a 4-point Likert-type scale consisting of 21 items, each scored between 0 (not at all) and 3 (severely). The minimum and maximum total scores in the scale are 0 and 63. The categories reflected by BAI scores are minimal anxiety (0-7), mild anxiety (8-15), moderate anxiety (16-25), and severe anxiety (26-63). The Cronbach's alpha internal consistency coefficient of the scale was reported as 0.93[21]. In this study, the Cronbach's alpha coefficient of BAI was found as 0.88.

Edinburgh Postnatal Depression Scale:

The scale was developed by Cox in 1987. The scale aims to screen postpartum depression in women. EPDS, which is used to screen individuals for depressive symptoms, was tested for validity and reliability in Turkish by Engindeniz et al. (1996). The Cronbach's alpha coefficient of the scale was reported as 0.79. EPDS is a 4-point Likert-type scale with 10 items where each item is scored in the range of 0-3. The minimum and maximum scores of the scale are 0 and 30. A higher score indicates an increased risk of depressive symptoms. Respondents who score 13, which is the cutoff value, or higher are considered in the risk group for depressive symptoms[22]. In this study, the Cronbach's alpha coefficient of the scale was found as 0.76.

Statistical analysis

The data collected in the study were analyzed using the Statistical Package for the Social Sciences 25.0 for Windows (SPSS, Chicago, IL, USA). In the reporting of the results, the participants were divided into 3 groups: (1) those who started taking FA supplements

in the periconceptional period and kept taking it in the first 3 months of pregnancy (6 months in total), (2) those who took FA supplements in the first 3 months of pregnancy, and (3) those who never took FA supplements.

Analysis of variance (ANOVA) and chi-squared tests were used to compare the FA supplement usage durations of the participants based on some variables (sociodemographic, obstetric, and FA use-related). The Kolmogorov-Smirnov test was used to test the normal distribution of the data. Non-parametric tests were used for the BAI scores that were found non-normally distributed, while parametric tests were used for the EPDS scores that were normally distributed. The Kruskal-Wallis test was used to compare the BAI scores of the groups formed based on their FA use duration and status, whereas ANOVA was used to compare their EPDS scores. The Mann-Whitney U test and Tukey's test were used in the post hoc analyses. The Friedman test was used to analyze the time-dependent changes in BAI scores, while repeated-measures ANOVA was used to analyze the time-dependent changes in EPDS scores. Chi-squared tests were used to compare the FA usage durations of the participants against the score categories of the scales.

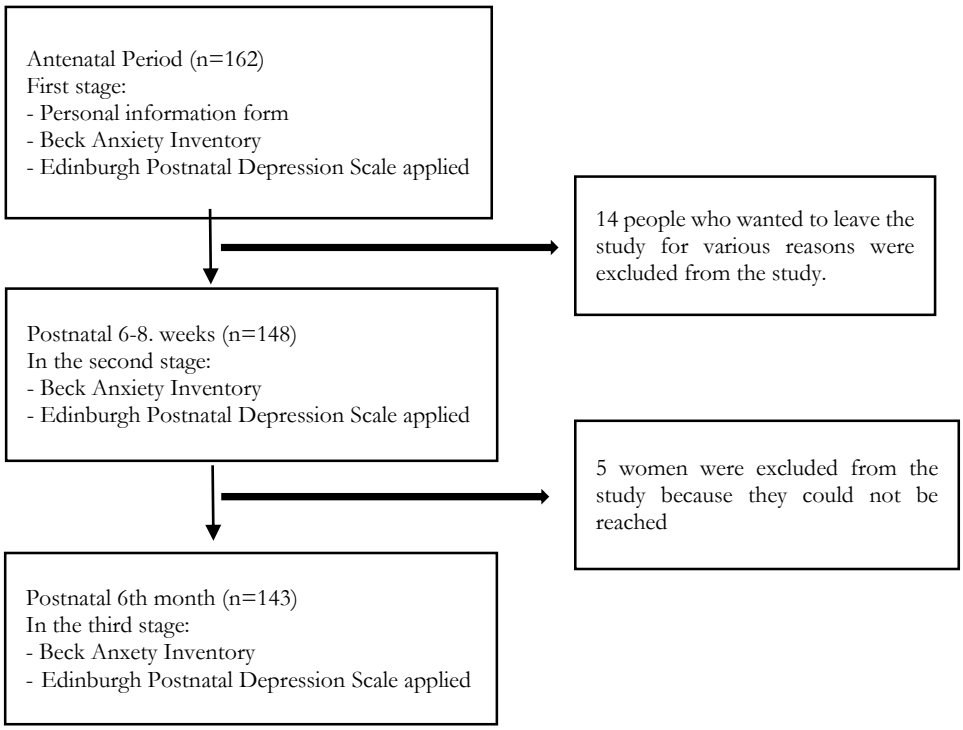

Figure 1. Flow chart of the study

RESULTS

Among the 162 participants, 53 (32.7%) took FA supplements for 6 months, 56 (34.6%) took them for 3 months (only at the beginning of pregnancy), and 53 (32.7%) never took FA supplements. Table 1 shows the results of the comparison of the FA supplement usage durations of the participants based on their sociodemographic and obstetric characteristics. The participants who were university graduates, those who had good income levels, and those who were primigravidae had significantly higher rates of taking FA supplements for 6 months ($p<0.05$). The participants who were not working, those who did not have social security, and those who were having unwanted pregnancies had significantly higher rates of not taking FA supplements at all ($p<0.001$) (Table 1).

Table 1. Comparison of the duration of folic acid supplementation according to sociodemographic and obstetric characteristics of women (n=162)

Variables	FA users 6 months (n=53)		FA users ≤3 months (n=56)		Nonusers (n=53)		Test and p value
	n	%	n	%	n	%	
Age (y) (Mean ± SD)	27.80±4.24		28.35±5.76		28.50±7.31		F=0.177 p=0.838
18-30	36	35.3	36	35.3	30	29.4	χ^2=1.521 p=0.468
≥ 31	17	28.3	20	33.3	23	38.4	
Education level							
Primary-secondary school	4	5.8	32	47.1	32	47.1	χ^2=56.898 p<0.001
High school	15	32.6	13	28.3	18	39.1	
University	34	70.8	11	22.9	3	6.3	
Income level							
Low	2	8.7	7	30.4	14	60.9	χ^2=43.874 p<0.001
Moderate	23	22.8	43	42.6	35	34.6	
Good	28	73.7	6	15.8	2	10.5	
Employment status							
Employed	25	78.1	4	12.5	3	9.4	χ^2=37.391 p<0.001
Unemployed	28	52.8	52	92.9	50	94.3	
Has social security							
Yes	51	38.6	48	36.4	33	25.0	χ^2=21.273 p<0.001
No	2	6.6	8	26.7	20	66.7	
Parity							
Primigravida	29	41.4	25	35.7	16	22.9	χ^2=6.569 p=0.037
Multigravida	24	26.1	31	33.7	37	40.2	
Having a planned pregnancy							
Yes	51	40.2	44	34.6	32	25.2	χ^2=20.109 p<0.001
No	2	5.7	12	34.3	21	60.0	
Having a wanted pregnancy							
Yes	52	38.0	48	35.0	37	27.0	χ^2=16.351 p<0.001
No	1	4.0	8	32.0	16	64.0	

The results of the comparison of the participants based on their FA usage-related characteristics are given in Table 2. While the participants who did not take any other supplements during their pregnancy, those who did not receive information about FA during the antenatal and postnatal periods, and those who did not know why FA is used had significantly higher levels of not taking FA supplements at all, the participants who knew about FA-rich foods had a significantly higher rate of taking FA supplements for 6 months ($p<0.001$). Most of the participants who thought FA supplementation is beneficial took these supplements for 6 months, while most of those who took FA supplements based on the recommendations of a physician or midwife took them for 3 months ($p<0.001$) (Table 2).

Table 2. Comparison of participants regarding variables related to folic acid

Variables	FA-users 6 months (n=53)		FA-users ≤3 months (n=56)		Nonusers (n=53)		Test and p value
	n	%	n	%	n	%	
Have you taken any supplements other than folic acid?							
Yes	49	43.8	49	43.8	14	12.4	χ^2=67.686 p<0.001
No	4	8.0	7	14.0	39	78.0	
Have you heard about folic acid before pregnancy?							
Yes	46	58.2	32	40.5	1	1.3	χ^2=78.866 p<0.001
No	7	8.4	24	28.9	52	62.7	
Have you heard about folic acid in pregnancy?							
Yes	49	42.2	53	45.7	14	12.1	χ^2=79.179 p<0.001
No	4	8.7	3	6.5	39	84.8	
Do you know why you use folic acid?							
Yes	46	50.0	42	45.7	4	4.3	χ^2=79.382 p<0.001
No	7	10.0	14	20.0	49	70.0	
Do you know foods rich in folate?							
Yes	32	60.4	19	35.8	2	3.8	χ^2=38.628 p<0.001
No	21	19.3	37	33.9	51	46.8	
Why do you use folic acid?							
Useful	36	65.5	19	34.5	-	-	χ^2=171.489 p<0.001
Doctor recommended	11	34.4	20	62.5	1	3.1	
Midwife recommended	6	27.3	16	72.7	-	-	
I didn't use	-	-	1	1.9	52	98.1	

Table 3 presents the results of the comparison of the anxiety and depression scores of the participants. It was determined that 39.5% of the participants who took FA supplements for 3 months and 37.0% of those who did not take FA supplements at all experienced mild/moderate/severe anxiety in the antenatal period, while 37.0% of those who took FA supplements for 3 months and 50.8% of those who never took these supplements were found to experience mild/moderate/severe anxiety in the 6th-8th weeks of the postnatal period ($p<0.05$). The antenatal BAI scores of the participants who took FA supplements for 6 months were significantly lower than the scores of those who took FA supplements for 3 months ($p<0.05$). In the assessments made in the 6th-8th weeks of the postnatal period, the participants who used FA supplements for 6 months had significantly lower BAI scores than those who took these supplements for 3 months and those who did not take them at all ($p<0.05$). Moreover, in the 6th-month measurements in the postnatal period, the scores of the participants who took FA supplements for 6 or 3 months were significantly lower than the scores of those who never took these supplements ($p<0.05$) (Table 3).

In the antenatal period assessments, EPDS scores were significantly lower among the participants who took FA supplements for 6 months in comparison to those who took these supplements for 3 months and those who never took these supplements, while the participants who took FA supplements for 6 or 3 months had significantly lower EPDS scores than those who never took them in the 6th-month postnatal measurements ($p<0.05$). The BAI and EPDS scores of the participants significantly decreased through the antenatal, postnatal 6th-8th-week, and postnatal 6th-month assessments ($p<0.001$) (Figure 2a,b).

Table 3. Comparison of participants regarding anxiety and depression

Variables	FA users 6 months		FA users ≤3 months		Nonusers		Test[a] and p value
	n	%	n	%	n	%	
BAI 1 group (n=162)							
Minimal	34	42.0	24	29.6	23	28.4	χ^2=6.313 p=0.043
Mild/Moderate/Severe	19	23.5	32	39.5	30	37.0	
BAI 2 group (n=148)							
Minimal	36	42.4	30	35.2	19	22.4	χ^2=19.211 p<0.001
Mild/Moderate/Severe	8	12.7	23	36.5	32	50.8	
BAI 3 group (n=143)							
Minimal	41	33.1	40	32.2	43	34.7	χ^2=2.718 p=0.257
Mild/Moderate/Severe	3	15.8	9	47.4	7	36.8	
	Median±SD (min-max)		Median±SD (min-max)		Median±SD (min-max)		Test[b] and p value
BAI 1 Total	6±6.89[x] (0-33)		9±8.95[y] (1-42)		8±6.42[z] (2-43)		KW=7.127 p=0.028, x<y
BAI 2 Total	5±2.65[x] (0-12)		7±6.71[y] (0-27)		8±3.01[z] (2-18)		KW=20.983 p<0.001, x<y,z
BAI 3 Total	3±2.82[x] (0-15)		3±5.02[y] (0-27)		5±2.22[z] (0-13)		KW=16.791 p<0.001, x,y<z
Test[d] and p-value	χ^2=30.878 p<0.001		χ^2=44.800 p<0.001		χ^2=32.075 p<0.001		
	n	%	n	%	n	%	Test[a] and p value
EPDS 1 group (n=162)							
No	49	33.8	48	33.1	48	33.1	χ^2=1.411 p=0.494
Yes	4	23.5	8	47.1	5	29.4	
EPDS 2 group (n=148)							
No	44	32.6	50	37.0	41	30.4	χ^2=12.340 p=0.002
Yes	-		3	23.1	10	76.9	
EPDS 3 group (n=143)							
No	44	31.8	48	33.8	50	35.2	χ^2=1.932 p=0.381
Yes	-		1	100	-		
	Mean±SD		Mean±SD		Mean±SD		Test[c] and p value
EPDS 1 Total	5.16±3.64[x]		7.05±4.09[y]		8.00±3.48[z]		F=7.804 p=0.001, x<y,z
EPDS 2 Total	6.11±2.76[x]		6.25±4.5[y]		9.17±3.23[z]		F=11.463 p<0.001, x,y<z
EPDS 3 Total	3.45±2.37[x]		4.02±2.98[y]		6.16±2.47[z]		F=14.126 p<0.001, x,y<z
Test[e] and p-value	F=15.966 p<0.001		F=17.149 p<0.001		F=22.708 p<0.001		

BAI 1, EPDS 1: antenatal period; BAI 2, EPDS 2: postnatal period 6-8 weeks; BAI 3, EPDS 3: postnatal period 6 months
[a]Chi-squared test, [b]Kruskal-Wallis test, [c]One-way ANOVA test, [d]Friedman Test, [e]Repeated Measures ANOVA

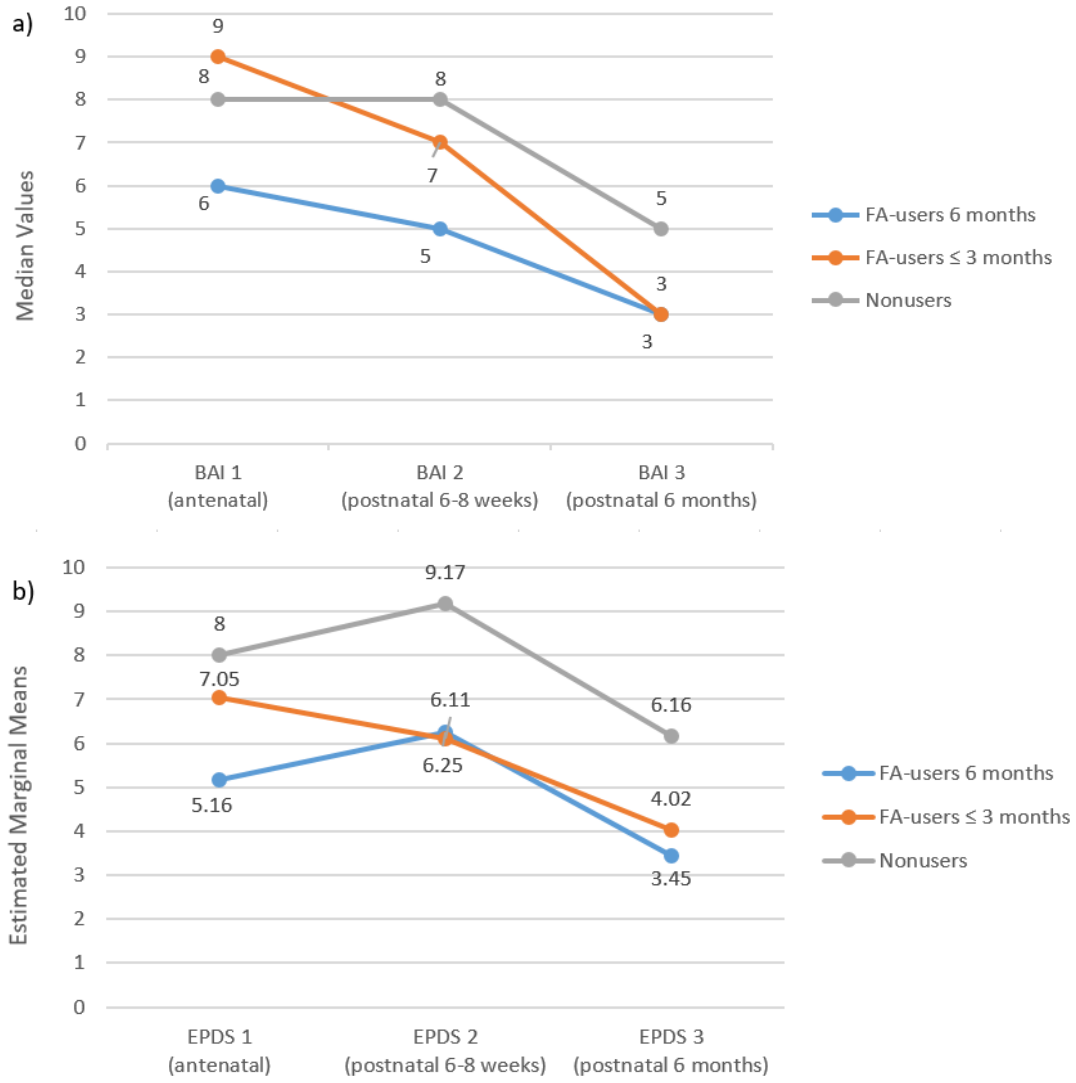

Figure 2 a,b. Line graph of participants' anxiety (a) and depression (b) scores.

DISCUSSION

The numbers of pregnant women who participated in this study who used FA supplements for 6 months in total starting in the periconceptional period, those who took these supplements only in the first 3 months of pregnancy, and those who never took these supplements were very similar, each group constituting approximately one-third of the participants. Different results have been obtained in other studies on the usage rates of FA supplements. In general, the rates of starting to take FA supplements have been reported low in the periconceptional period and the highest right after the identification of pregnancy[23]. In their study in Italy, Nilsen et al. determined that 84% of women took FA supplements before their pregnancy and/or at any point in pregnancy, while only 23.5% started taking them before pregnancy[23]. In a meta-analysis presenting the results of 105 studies conducted in 34 countries including Turkey, the prevalence of FA supplement usage was reported as 32-51% in North America, 9-78% in Europe, 21-46% in Asia, 4-34% in the Middle East, 32-39% in Australia and New

Zealand, and 0% in Africa[24]. While discrepancies about the prevalence of FA supplement usage may be associated with the health policies of countries, these results have shown that future studies need to investigate the issue of FA supplement usage in more detail.

Anxiety and depression are significant psychological problems in the antenatal and postnatal periods. The physical, biological, and psychological changes experienced by women in the antenatal and postnatal periods make them more predisposed to anxiety and depression.[25] In this study, where the effects of FA supplement usage among pregnant women on anxiety and depression in the antenatal and postnatal periods were examined, it was determined that the participants who started to take FA supplements in the periconceptional period and continued to take them in the first three months of pregnancy (for 6 months in total) had the lowest anxiety and depression rates and scores. It was found that this effect was present not only in pregnancy but also at the 6th-8th weeks and 6th month of the postnatal period. While these results showed that FA supplementation can be effective in the prevention of psychological problems in the antenatal and postnatal periods, they also suggested that the duration of using FA supplements is also important. Results on the relationship between psychological problems in the perinatal period and FA supplementation in previous studies are not consistent. While some studies have found FA supplementation to be a protective factor against depression in women[26,27], others have not identified a significant relationship between FA supplementation and depression or anxiety[28,29]. In the cohort study conducted by Yan et al., the rate of postpartum depression in women who used FA supplements for more than 6 months in pregnancy was lower than the rate in those who used FA supplements for less than 6 months[9]. Lewis et al. presented evidence that following FA supplementation, no substantial increase occurred in depression scores during pregnancy or up to the 8th month after childbirth, and FA supplementation in pregnancy could provide protection against an increase in depressive symptoms between the 8th and 21st months in the postnatal period[26]. A cohort study that was carried out in Singapore revealed that there was no significant difference between the maternal folate levels of participants who had postpartum depression and those who did not[29]. Zhao et al. also stated that the relationship between anxiety and FA supplementation is unclear[30]. In addition to these reports, considering the high prevalence of anxiety and depression in the antenatal and postnatal periods[31], the role of FA supplementation in the prevention and treatment of anxiety and depression should be studied further.

In this study, it was found that the participants who were university graduates and those who had good self-reported income levels had higher rates of taking FA supplements for 6 months. On the other hand, the participants who were not working and those who did not have social security had higher rates of not taking FA supplements at all. Similarly, Yan et al. reported that women who took FA supplements in pregnancy for more than 6 months had higher education levels and household income levels[9]. Moreover, Nilsen et al. observed that pregnant women who had higher levels of education were more likely to start taking FA supplements before pregnancy, and they used FA supplements for a longer time[21]. Gazzino et al. also reported higher rates of FA supplement use among pregnant women who were working and those with high education levels[32]. These results were in support of the results of this study, and they showed that sociodemographic characteristics influence FA supplement usage rates.

The participants of our study who were primigravidae were determined to have higher rates of taking FA supplements for 6 months, while those whose pregnancies were unplanned or unwanted had higher rates of not taking FA supplements at all. The results of this study were similar to those of other studies. In the study performed by Pektaş et al., 76.2% of women whose pregnancies were planned were found to use FA supplements[33]. Nilsen et al. reported that women whose pregnancies were planned and those with low parity took FA supplements for longer durations[23]. Gazzino et al. also reported higher rates of FA supplementation use among women with planned pregnancies[32]. These results can be interpreted as that women who want to get pregnant and those who are pregnant for the first time are more motivated to take FA supplements.

In our study, according to the analyses of FA usage rates among the participants based on their FA-related characteristics, the participants who did not take other supplements in pregnancy, those who did not receive information about FA before and during pregnancy, and those who did not know why FA supplements are used had higher rates of not taking FA supplements at all. As opposed to this result,

those who knew about FA-rich foods and those who thought FA supplements are beneficial had higher rates of using FA supplements for 6 months. Furthermore, most of the participants who took FA supplements upon the recommendations of physicians and midwives took these supplements for 3 months. In this study, we obtained similar results to those reported in other studies in the literature examining the factors affecting the use of FA supplements. These results may indicate that the duration of using FA supplements increases when women receive accurate information on FA, and women who learn about their pregnancy start using FA supplements based on the recommendations of healthcare professionals.

The results that were obtained in this study revealed that FA supplementation can be effective in the prevention of anxiety and depression symptoms in the antenatal and postnatal periods. Additionally, it was determined that sociodemographic and obstetric characteristics affected the rates of FA supplement use, and the confirmation of pregnancy and having information about FA increased the usage rates of FA supplements. Healthcare professionals, especially physicians and midwives, have important responsibilities in efforts to increase the use of FA supplements among pregnant women. To not only increase the quality of periconceptional care but also raise awareness in women who are planning to get pregnant or are in the early period of pregnancy regarding especially FA, in addition to other vitamins, information and counseling services, training programs, brochures, or booklets should be provided to these women. The information healthcare professionals have about the issue should be kept up to date by providing them with in-service training.

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