



Prevalence of migraine menstrual, migraine and risk factors in women of reproductive age; a multi-centre study

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Abstract

Purpose To determine the prevalence and risk factors associated with migraine and menstrual migraine in women of reproductive age.

Method This multicenter cross-sectional study included 2049 women who were successfully contacted between May and December 2023. The data were collected via an online interview method using the Individual Identification Form, which was created by the researchers and consists of three parts.

Results The mean age of the study participants was determined to be 24.19 ± 7.76 years. The prevalence of migraine was found to be 16.4%, while the prevalence of menstrual migraine was 56.4%. A statistically significant relationship was identified between migraine diagnosis and a number of variables, including marital status, educational status, employment status, social security status, income status, family type, smoking habits, alcohol consumption and coffee intake ($p < 0.05$). A statistically significant relationship was found between menstrual headache and marital status, working in a gainful job, presence of social security, income status, family type, smoking, alcohol use and coffee consumption ($p < 0.05$).

Conclusion Many sociodemographic characteristics and habits in women's daily lives are among the risk factors for migraine and menstrual migraine. It is advisable for health professionals to provide comprehensive counseling services to facilitate the adoption of healthy behaviors in relation to these risk factors.

Keywords Reproductive age · Women · Migraine · Menstrual migraine

Introduction

Migraine is a primary headache disorder that affects 14% of the global population at all ages. The prevalence of migraine varies significantly by age and gender. Women are affected 2–3 times more often than men during their reproductive years [1]. It is assumed that the high prevalence of migraine in women is due to the effect of female sex hormones on neurotransmitter systems, neuropeptide release involved in migraine pathophysiology, neuronal excitability, and underlying genetic and environmental factors [2]. The onset of migraine is most commonly observed during adolescence and is typically experienced by individuals between the ages of 35 and 45 [3]. The Global Burden of Disease (GBD) study identifies migraine as the third leading cause of disability among ten chronic diseases in individuals under the age of 50. It is estimated that approximately 3 billion people worldwide experience migraines (1.04 billion) and tension-type headaches (1.89 billion) [4].

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Background and significance

Migraine is two to three times more prevalent in women than in men. Women also report a longer attack duration, an increased risk of headache recurrence, greater disability, and a longer time required for recovery [5, 6]. The incidence of migraine is highest between the ages of 20 and 24 in women (18.2 per 1,000 person-years) and between the ages of 15 and 19 in men (6.2 per 1,000 person-years). The cumulative incidence is 43% in women and 18% in men. The median age of onset is 25 for women and 24 for men. In approximately half of cases, the onset of migraine occurred before the age of 25, while in 75% of cases, it occurred before the age of 35 (Stewart et al., 2018). In a study conducted in Turkey, the prevalence was 19.9%. It was 9.34% (95% CI: 8.6–10) in men and 29.3% (95% CI: 27–31.6.6) in women [7]. In the prospective study by Baykan et al., (2015) the incidence of migraine in our country was reported as 2.38% over a five-year period, with 2.98% of cases occurring in women and 1.93% in men. It has been demonstrated that more than 80% of women with migraines experience a clear improvement during pregnancy [8]. However, 15% continue to have headaches and 5% experience a worsening of their headaches [9].

A subgroup of female migraineurs experience regular and predominantly perimenstrual migraine attacks. The incidence of migraine attacks varies throughout the menstrual cycle, averaging on the first day of menstruation and peaking on day 5. The International Classification of Headache Disorders (ICHD 3) defines menstrual migraine (MM) as migraine attacks occurring between days – 2 and + 3 of the menstrual cycle in at least two of three consecutive menstrual cycles. Migraine affects 7.6% of all women and 22% of women with migraine in at least 50% of their menstrual cycle [10]. The prevalence of migraine or menstrual migraine is considerable among women. The majority of women tend to normalise migraines and menstrual migraines and do not consult any specialist. A specific and early approach to this problem is required to prevent the development of chronic headaches and to avoid headaches becoming a limiting pathology in adulthood. Nevertheless, these treatments are not without risks, and there is an increasing need for research and knowledge on risk factors and non-pharmacological measures. Furthermore, nurses and other healthcare professionals in this field should be kept abreast of the prevalence of this problem in women and the potential associated risk factors, as they may act as facilitators of new health behaviours [11].

The results will be used in the literature and by nurses in primary health care institutions. Furthermore, other health professionals in this field will be able to screen women of reproductive age for these disorders and recommend the

necessary coping methods. Furthermore, it will be able to refer those who have experienced severe effects on their quality of life to the appropriate specialist. In this context, the objective of the study is to determine the prevalence and risk factors of migraine and menstrual migraine in women of reproductive age in various regions of Turkey.

The following study questions are presented for consideration:

1. What is the prevalence of migraine in various regions in women of reproductive age?
2. What is the prevalence of menstrual migraine in women of reproductive age in different regions?
3. What are the risk factors for migraine in women of reproductive age?
4. What are the risk factors for menstrual migraine in women of reproductive age?

Methods

Design

The research is a cross-sectional type descriptive research.

Setting

The research was conducted among women of reproductive age between the ages of 15 and 49 who were working or students at all 15 universities across Turkey that gave written permission between May and December 2023.

Participants

Data were collected from women of reproductive age (15–49 years old) who could be reached at 15 universities. Within the scope of the research, all women working or studying at universities were included in the study. Since all women who could be reached at universities were included in the study, no sample selection was made.

Inclusion criteria (1) Being of reproductive age, (2) working or studying at a university, (3) being a woman between

the ages of 15–49, (4) volunteering to participate in the research, (5) having regular periods.

Exclusion criteria (1) *Having* surgical or natural menopause, (2) *having* a neurological diagnosis that may cause headaches, (3) interruption of answering questions.

Instruments

The data collection tool prepared by the researchers in line with the literature consists of a total of 40 questions and three sections including sociodemographic characteristics (17 questions), menstruation information (6 questions), migraine and/or menstrual migraine characteristics (17 questions) [11–14].

The sociodemographic information The sociodemographic information collected includes age, marital status, education, employment status, economic status, the longest lived region or place, family type, habits, the number of births, and the number of children [11–14].

Menstrual information Menstruation-related characteristics include age at first menstrual regularity, menstrual cycle, menstrual pain, menstrual pain severity, and family planning method [11–14].

Migraine and/or menstrual migraine information The characteristics of migraine and/or menstrual migraine, menstrual headache, menstrual headache severity, menstrual headache onset time, menstrual headache frequency, menstrual headache onset time, conditions accompanying menstrual headache, conditions that trigger menstrual headache, and the diagnosis of migraine are included. The data set includes information on the location of migraine pain, the frequency of migraine attacks, the duration of migraine episodes, the duration of medication use, the severity of migraine attacks, the methods employed to cope with migraine, the disorders that accompany migraine, the duration of migraine attacks in the absence of medication, and the number of school absences due to migraine [11–14].

Procedure

The data was collected via an online interview method, with the research link shared through the Electronic Information Management System (EBYS), which is used to reach university employees and students. To prevent participants from answering questions more than once, only the relevant section was enabled in the Google Form.

Data analysis

Statistical analysis was conducted using the SPSS (Statistical Package for Social Science) 26.0 package program. Qualitative data were presented as numerical values and percentages, while quantitative data were displayed as the mean and standard deviation. Overall comparisons in qualitative data were made with the Chi-square test, and in cases where there was a significant difference, the percentages of the categories for the relevant answer were compared by applying the Bonferroni correction. The statistical significance level was set at 5%.

Ethical considerations

This study obtained written approval from the Human Research Ethics Committee of Sinop University (Date: April 10, 2023; Approval Number: 2023/51), ensuring adherence to ethical standards. Written permission was obtained from 15 universities through the inter-university internet network EBYS, where the research will be conducted. Additionally, the necessary information about the study was provided in the research link. The research was conducted in accordance with the Declaration of Helsinki.

Results

Sociodemographic information

Sociodemographic information of the participants is presented in Table 1. The average age of the women participating in the study was determined as 24.19 ± 7.76 . It was determined that 79.89% of the participants were single, 82.24% were university educated, and 84.97% had a nuclear family (Table 1).

Migraine diagnosis and features

A total of 16.4% of the participants reported a diagnosis of migraine. The majority of women (51.03%) reported that the pain location was sometimes single and sometimes double. Furthermore, 52.80% stated that the pain frequency was 1–4 times a month, 28.91% stated that the pain continued for 1–4 h, 82.01% stated that they used painkillers to cope with the pain, and 28.91% stated that the pain frequency occurred 1–4 times a month. Additionally, 37.17% of women reported taking medication between 30 min and 4 h after their pain started (Table 2).

Table 1 Socio-demographic information

	<i>n</i>	%
Age (Mean SD)	24.19	7.76
Marital status		
Married	392	19.13
Single	1637	79.89
Other	20	0.98
Educational status		
Primary Education	16	0.78
High school	100	4.88
University	1685	82.24
Postgraduate	248	12.10
Employment status		
Yes	501	24.45
No	1548	75.55
Social security		
Yes	1370	66.86
No	679	33.14
Place of Living Longest Time		
City	1382	67.45
County	486	23.72
Village	181	8.83
Current Living Region		
Ege Region	551	26.89
Marmara Region	504	24.60
Black Sea Region	526	25.67
Mediterranean Region	95	4.64
Central Anatolia	183	8.93
Eastern Anatolia	87	4.25
South Eastern Anatolia	88	4.29
Other	15	0.73
Income status		
Income < expenditure	555	27.09
Income = expenditure	1188	57.98
Income > expenditure	306	14.93
Family Type		
Nuclear family	1741	84.97
Extended family	308	15.03

Menstrual migraine

Menstrual migraine and its features are listed in Table 3. A total of 56.2% of participants reported experiencing menstrual headaches, with 34.0% indicating that the headache occurred during menstruation and 42.9% stating that they had a headache each menstrual period. Additionally, 39.3% of participants reported that menstrual pain began in the morning hours, and 79.8% indicated that fatigue accompanied the headache. Table 3 indicates that 80.5% of respondents identified stress as a trigger for their headaches.

Table 2 Descriptive statistics for migraine diagnosis and related characteristics

	<i>n</i>	%
Getting a Migraine Diagnosis		
Yes	339	16.54
No	1710	83.46
Location of Migraine Pain		
One sided	102	30.09
Double-sided	47	13.86
Sometimes odd sometimes even	173	51.03
Unanswered	17	5.01
Frequency of Migraine Pain		
Less than once a month	80	23.60
1–4 Times a month	179	52.80
Many times, a week	70	20.65
Many times a day	6	1.77
Unanswered	4	1.18
Duration of Migraine Pain		
1–4 h	98	28.91
5–8 h	94	27.73
9–24 h	62	18.29
1–3 Days	69	20.35
More than three days	12	3.54
Unanswered	4	1.18
After Your Migraine Starts, Time to Take Medication		
First 30 min	110	32.45
30 Min – 4 h	126	37.17
Between 4–24 h	34	10.03
Between 3–7 days	3	0.88
After 7 days	2	0.59
It always changes	53	15.63
Unanswered	11	3.24
Migraine Pain Severity (Mean, SD)	7.26	1.95
Methods Used to Cope with Your Migraine Pain		
I Don't Use Anything	24	7.08
Painkiller	278	82.01
Massage	166	48.97
Breathing Exercises	47	13.86
Going Outdoors	97	28.61
Other	53	15.63
Application of Alternative Medicine Therapies (Acupuncture, Herbal Therapy, etc.)	66	19.47
Symptoms accompanying Migraine Pain		
Nausea Vomiting	204	60.18
Sensitivity to Light	278	82.01
Visual Impairments	104	30.68
Don't Be Disturbed by Loud Noise	276	81.42
Concentration Disorder	196	57.82
Irritability	234	69.03
Other	14	4.13
Pain without medication lasts 4–72 h	264	77.88
Absence from school/work due to migraine	183	53.98

Table 3 Descriptive statistics for menstrual migraine and related characteristics

	<i>n</i>	%
Headache During Menstruation		
There is	1152	56.2
None	897	43.8
Migraine severity during menstruation (Mean, SD)	5.9	2.1
Headache Start Day During Menstruation		
2 Days Before Period	247	21.4
1 Day Before Period	305	26.5
With Menstruation	392	34.0
One Day After Period	107	9.3
2 Days After Period	40	3.5
Other	57	4.9
Unanswered	4	0.3
Frequency of Headache During Menstruation		
Every Menstrual Period	494	42.9
More than 7 Pieces per Year	186	16.1
4–6 Menstrual Periods per Year	326	28.3
3 Menstrual Periods per Year	120	10.4
Other	18	1.6
Unanswered	8	0.7
When Menstrual Migraine Start		
Morning	453	39.3
Afternoon	205	17.8
Afternoon	246	21.4
Evening	229	19.9
Unanswered	19	1.6
Complaints accompanying migraine during menstruation		
Dizziness	306	26.6
Nausea Vomiting	523	45.4
Diarrhea	330	28.6
Sleeping disorder	439	38.1
Burnout	485	42.1
Tiredness	919	79.8
Swelling	661	57.4
Irritability	790	68.6
Feeling Depressed	618	53.6
Other	27	2.3
Factors That Trigger/Initiate Headaches		
Stress	927	80.5
Argument	383	33.2
Smell	311	27.0
Tiredness	894	77.6
Nutrition	326	28.3
Other	48	4.2

The connections between migraines, sociodemographic characteristics, and personal habits

The connections between immigrants, sociodemographic characteristics, and personal habits are presented in Table 4. An analysis found a significant correlation between the diagnosis of migraines and factors including marital status,

educational attainment, employment status, receipt of social security, income level, family structure, smoking, alcohol consumption, and coffee consumption (refer to Table 4, $p < 0.05$).

The observed migraine diagnosis rate among single individuals (13.6%) was significantly lower than that of married individuals (27.8%) and those in other marital statuses (35%). Additionally, individuals with a high school education or lower exhibited a significantly higher migraine diagnosis rate (26.7%) compared to those with a university education or higher (15.9%). Those engaged in gainful employment demonstrated a significantly higher migraine diagnosis rate (26.37%) compared to those not involved in such employment (13.4%). Similarly, individuals receiving social security displayed a significantly higher migraine diagnosis rate (18.2%) compared to those without social security (13.3%). Moreover, individuals with an income lower than their expenses had a significantly higher migraine diagnosis rate (19.8%) compared to those with an income equal to their expenses (14.5%). Notably, individuals from nuclear families showed a significantly higher migraine diagnosis rate (17.6%) compared to those from extended families (10.4%) ($p < 0.05$).

The migraine diagnosis rate of smokers (24.2%) was found to be statistically significantly higher than that of non-smokers or occasional smokers (14.9% and 15.2%, respectively). The rate of migraine diagnosis among non-drinkers (14.3%) was statistically significantly lower than among drinkers or occasional drinkers (26.5% and 20.3%, respectively). The migraine diagnosis rate of coffee drinkers (19.4%) was statistically significantly higher than that of coffee non-users and infrequent users (12.6% and 12.5%, respectively) ($p < 0.05$) (Table 4).

Examination of associations between menstrual migraine and demographic characteristics and habits

A statistically significant relationship was found between menstrual headache and marital status, employment, social security, income status, family type, smoking, alcohol consumption and coffee consumption (Table 5, $p < 0.05$). The rate of menstrual headache in the married group (53.8%) was statistically significantly lower than in the single and other groups (66.1% and 60%, respectively). The rate of menstrual headache in the employed group (67.7%) was statistically significantly higher than the rate in the non-employed group (52.5%). The rate of menstrual headache among those with social security (58%) was found to be statistically significantly higher than the rate among those without social security (52.6%). The menstrual headache rate of those whose income was more than their expenses

Table 4 Comparisons regarding migraine diagnosis

	Migraine diagnosis status		χ^2	<i>p</i> *
	Yes	No		
Marital status				
Married	109 ^a (27.8)	283 (72.2)	51.063	<0.001
Single	223 ^b (13.6)	1414 (86.4)		
Other	7 ^a (35)	13 (65)		
Education Status				
High school or below	31 ^a (26.7)	85 (73.3)	9.228	0.002
University or above	308 ^b (15.9)	1625 (84.1)		
Working Status				
Yes	132 ^a (26.3)	369 (73.7)	46.151	<0.001
No	207 ^b (13.4)	1341 (86.6)		
Social security				
Yes	249 ^a (18.2)	1121 (81.8)	7.96	0.005
No	90 ^b (13.3)	589 (86.7)		
Place of Living Longest Time				
City	245 ^a (17.7)	1137 (82.3)	5.971	0.051
County	74 ^a (15.2)	412 (84.8)		
Village	20 ^a (11)	161 (89)		
Current Living Region				
Ege Region	84 ^a (15.2)	467 (84.8)	9.697	0.206
Marmara Region	93 ^a (18.5)	411 (81.5)		
Black Sea Region	77 ^a (14.6)	449 (85.4)		
Mediterranean Region	19 ^a (20)	76 (80)		
Central Anatolia	30 ^a (16.4)	153 (83.6)		
Eastern Anatolia	11 ^a (12.6)	76 (87.4)		
South Eastern Anatolia	21 ^a (23.9)	67 (76.1)		
Other	4 ^a (26.7)	11 (73.3)		
Income status				
Income<expenditure	110 ^a (19.8)	445 (80.2)	8.948	0.011
Income=expenditure	172 ^b (14.5)	1016 (85.5)		
Income>expenditure	57 ^{a, b} (18.6)	249 (81.4)		
Family Type				
Nuclear family	307 ^a (17.6)	1434 (82.4)	9.946	0.002
Extended family	32 ^b (10.4)	276 (89.6)		
Smoking				
Yes	85 ^a (24.2)	266 (75.8)	18.063	<0.001
No	222 ^b (14.9)	1265 (85.1)		
Rarely	32 ^b (15.2)	179 (84.8)		
Alcohol Consumption Status				
Yes	44 ^a (26.5)	122 (73.5)	21.545	<0.001
No	208 ^b (14.3)	1246 (85.7)		
Rarely	87 ^a (20.3)	342 (79.7)		
Tea Consumption				
Yes	242 ^a (16.6)	1218 (83.4)	2.257	0.324
No	30 ^a (13.5)	192 (86.5)		
Rarely	67 ^a (18.3)	300 (81.7)		
Coffee Consumption				
Yes	233 ^a (19.4)	970 (80.6)	16.826	<0.001
No	46 ^b (12.6)	319 (87.4)		
Rarely	60 ^b (12.5)	421 (87.5)		
Fizzy Drinks				
Yes	52 ^a (17.1)	252 (82.9)		

Table 4 (continued)

	Migraine diagnosis status		χ^2	p^*
	Yes	No		
No	156 ^a (17.7)	725 (82.3)	2.128	0.345
Rarely	131 ^a (15.2)	733 (84.8)		

Each letter is used to show that there is no statistically significant difference at the 5% significance level between the percentages of rows answering yes to the relevant question.

*Chi-square test

(53.3%) was statistically significantly lower than the rate of those whose income was equal to their expenses (63.1% and 58.7%). The menstrual headache rate of those with a nuclear family type (57.2%) was found to be statistically significantly higher than that of those with an extended family type (51%) ($p < 0.05$) (Table 5).

The menstrual headache rate of smokers (67.5%) was found to be statistically significantly higher than the rate of non-smokers (53.3%). The menstrual headache rate of those who did not drink alcohol (52.5%) was found to be statistically significantly lower than the rate of those who used alcohol or rarely used it (65.7% and 65%, respectively). The menstrual headache rate of coffee drinkers (59.4%) was found to be statistically significantly higher than the rate of non-coffee drinkers (49.6%; $p < 0.05$) (Table 5).

Discussion

This study was conducted to determine the prevalence and risk factors of migraine and menstrual migraine in women of reproductive age; Although the number of people diagnosed with migraine is low, it has been determined that there are people who experience migraine symptoms. In addition, results have been obtained that women experience headaches more during their menstrual periods and that headaches are associated with many factors.

In a study conducted across 21 provinces in Turkey, the prevalence of migraine was identified as 16.4% in 2008, which subsequently rose to 16.7% in 2013. The study also reported the incidence of migraine as 2.38%, with 2.98% among women and 1.93% among men [8]. Additionally, a separate study in the United States found that 18% of women and 6% of men experienced migraine pain [15]. A study conducted by Gasperi et al. (2004) determined the lifetime prevalence of migraine to be 30.1% in women [16]. In a twelve-year prospective Danish study, the incidence of migraine was reported to be 0.81% and 2.3% in women, with the highest incidence rates observed in adults aged 25–34 [17]. Studies on migraine prevalence in Turkey are relatively limited. The reported prevalence rates and the results of this study conducted in Turkey support the high incidence of migraine. This may be due to the fact that those

who were directly diagnosed with migraine pain in the study were considered to have migraine pain, and those who were not diagnosed were not included. In studies conducted around the world, results vary according to regions and countries. It can be thought that genetic factors will affect the high migraine prevalence.

The study revealed that 56.2% of women experienced menstrual migraine. A similar prevalence was reported in a study conducted with the Health Vocational High School in our country, with 49.8% of high school students experiencing menstrual migraine [12]. In a study conducted in Spain, the prevalence of menstrual migraine was determined as 45.15%⁹. The American Headache Society states that the prevalence of menstrual-related migraine without aura in women with migraine varies between 35 and 51%, while the prevalence of pure menstrual migraine without aura varies between 7 and 19% [18]. In their review, Vervik and McGrager report that menstrual migraine affects approximately 20–25% of female migraineurs in the general population and 22–70% of patients presenting to headache clinics. They also state that in women diagnosed with menstrual migraine, perimenstrual migraine attacks are associated with significantly more disability than non-menstrual attacks [1]. The results of this study are consistent with those of a similar study conducted in our country and Spain. However, other studies differ in that they generally report the prevalence of menstrual migraine in women with migraine.

The study revealed a statistically significant correlation between migraine diagnosis and a number of factors, including marital status, educational status, gainful employment, social security coverage, income status, family composition, smoking habits, alcohol consumption and coffee intake. Given that chronic migraine is a debilitating disease and treatment response rates are relatively low, it is of great importance to identify and treat or eliminate modifiable risk factors. The most significant risk factors for the transition from episodic migraine to chronic migraine are the overuse of acute migraine medications, ineffective acute treatment, obesity, depression, and stressful life events such as divorce or recent widowhood [19]. In Pakistan, it has been demonstrated that stress, physical activity and menstruation increase the risk of migraine in women with migraine, while

Table 5 Comparisons regarding the presence of menstrual migraine

	Migraine during menstruation		χ^2	p*
	Yes	No		
Marital status				
Married	259 ^a (66.1)	133 (33.9)	19.411	<0.001
Single	881 ^b (53.8)	756 (46.2)		
Other	12 ^{a, b} (60)	8 (40)		
Education Status				
High school or below	68 ^a (58.6)	48 (41.4)	0.287	0.592
University or above	1084 ^a (56.1)	849 (43.9)		
Working Status				
Yes	339 ^a (67.7)	162 (32.3)	35.275	<0.001
No	813 ^b (52.5)	735 (47.5)		
Social security				
Yes	795 ^a (58)	575 (42)	5.483	0.019
No	357 ^b (52.6)	322 (47.4)		
Place of Living Longest Time				
City	796 ^a (57.6)	586 (42.4)	3.915	0.141
County	264 ^a (54.3)	222 (45.7)		
Village	92 ^a (50.8)	89 (49.2)		
Current Living Region				
Ege Region	325 ^a (59)	226 (41)	12.729	0.079
Marmara Region	292 ^a (57.9)	212 (42.1)		
Black Sea Region	270 ^a (51.3)	256 (48.7)		
Mediterranean Region	49 ^a (51.6)	46 (48.4)		
Central Anatolia	114 ^a (62.3)	69 (37.7)		
Eastern Anatolia	43 ^a (49.4)	44 (50.6)		
Other	50 ^a (56.8)	38 (43.2)		
Income status				
Income<expenditure	326 ^{a, b} (58.7)	229 (41.3)	11.431	0.003
Income=expenditure	633 ^b (53.3)	555 (46.7)		
Income>expenditure	193 ^a (63.1)	113 (36.9)		
Family Type				
Nuclear family	995 ^a (57.2)	746 (42.8)	4.057	0.044
Extended family	157 ^b (51)	151 (49)		
Smoking				
Yes	237 ^a (67.5)	114 (32.5)	23.484	<0.001
No	793 ^b (53.3)	694 (46.7)		
Rarely	122 ^{a, b} (57.8)	89 (42.2)		
Alcohol Consumption Status				
Yes	109 ^a (65.7)	57 (34.3)	27.537	<0.001
No	764 ^b (52.5)	690 (47.5)		
Rarely	279 ^a (65)	150 (35)		
Tea Consumption				
Yes	832 ^a (57)	628 (43)	1.541	0.463
No	124 ^a (55.9)	98 (44.1)		
Rarely	196 ^a (53.4)	171 (46.6)		
Coffee Consumption				
Yes	715 ^a (59.4)	488 (40.6)	13.328	0.001
No	181 ^b (49.6)	184 (50.4)		
Rarely	256 ^{a, b} (53.2)	225 (46.8)		
Fizzy Drinks				
Yes	168 ^a (55.3)	136 (44.7)	0.699	0.705
No	489 ^a (55.5)	392 (44.5)		
Rarely	495 ^a (57.3)	369 (42.7)		

Each letter is used to show that there is no statistically significant difference at the 5% significance level between the percentages of rows answering yes to the relevant question.

*Chi-square test

weight loss, breakfast, lunch, thirst, injury and pregnancy reduce the risk of second trimester migraine [20].

A review by Amiri et al. (2022) identified a correlation between migraine and an increased risk of substance use and addiction. In comparison to major depressive disorder and anxiety disorders, the comorbidity between substance use and migraine is less pronounced, and findings are occasionally contradictory. In addition, while age, female gender and low education level are the most important demographic risk factors for migraine chronicity, it has been stated that higher education can be a protective factor against migraine. Migraine can occur at any age, but the prevalence rate has been found to be highest before the age of 45. Thereafter, the prevalence rate has been observed to increase in early adulthood, peak in middle age, and then gradually decline [21]. In this study and other studies, separation from a spouse or partner, alcohol consumption and low educational status have been identified as similar migraine risk factors.

A statistically significant relationship was identified between menstrual migraine and many factors, including marital status, employment status, social security, income status, family type, smoking habits, and alcohol consumption. Additionally, coffee consumption was found to be a risk factor for menstrual migraine. A study conducted in Spain identified several risk factors for menstrual migraine, including dysmenorrhea, use of hormonal contraceptive methods, menstrual irritability, menstrual dizziness, and daily consumption of cola drinks [9]. The number of studies on menstrual migraine is limited. The risk factors identified in this study differ from those identified in the study conducted in Spain. The observed result may be attributed to regional differences and the focus on different risk factors.

Implications for nursing research and practice

This study represents an important step in the development and evaluation of strategies for menstrual migraine by nurses and other health professionals working in reproductive health and primary care units. It reveals the relationship between migraine and menstrual migraine prevalence and risk factors. Moreover, the results provide important information about the methodological approaches required for further research.

Limitations

This study was conducted to evaluate the prevalence of menstrual migraine and its associated risk factors among women of reproductive age. The strength of this study lies in its large sample size, which represents all regions of Turkey. Additionally, the findings can be generalized to women

with similar sociodemographic characteristics. However, several methodological limitations warrant discussion.

Sample Representativeness: The study sample was restricted to university students, which limits the generalizability of the findings to broader populations with varying socioeconomic and educational backgrounds. Future research should aim to include more heterogeneous samples to more accurately reflect the societal distribution of menstrual migraine. **Data Collection Method:** Data were gathered using a Google Form survey. While this method provides accessibility and efficiency, it is susceptible to self-report biases, including social desirability, misinterpretation of questions, and recall bias. Furthermore, the online format may systematically exclude individuals without reliable internet access, thereby introducing selection bias.

Lack of Biological Measures: Hormonal and biological factors were assessed primarily through indirect indicators (e.g., menstrual regularity, contraceptive use, and migraine timing in relation to the menstrual cycle). The absence of objective biochemical measurements, such as serum hormone levels, limits the depth of understanding. Future studies could benefit from incorporating these objective measures to gain further insights into the pathophysiology of menstrual migraine.

Cross-Sectional Design: The cross-sectional nature of this study restricts the ability to draw causal inferences. The findings represent associations observed at a single point in time and do not account for temporal changes or fluctuations in hormonal levels. Longitudinal studies are recommended to investigate the progression of menstrual migraine and its relationship with hormonal dynamics over time.

Conclusion

In addition to the high prevalence of migraine in women, the study observed a high prevalence of menstrual migraine. Migraine is a neurological disease that is the most common type of headache, can cause significant disability, and is challenging to diagnose. In the diagnosis of women experiencing migraine and menstrual migraine, both the delay in seeking medical attention and the inadequacy of the diagnosis contribute to delays. Consequently, while individuals need to be aware of the symptoms of migraine, it is equally crucial for healthcare professionals to implement rapid and accurate diagnosis and appropriate treatment and care management.

In the diagnosis of migraine and menstrual migraine in women, it is also important to consider the possibility of other conditions that may present similarly. Healthcare providers should be knowledgeable about the pharmacological treatments of both diseases. It is imperative to continue

investigating interventions aimed at establishing healthy lifestyle behaviors and pharmacological pain relief methods and pharmacological measures, as well as lifestyle changes, in patients with a prevalence of migraine and menstrual migraine. It is therefore recommended that nurses and other health professionals receive the necessary training in this regard and that they provide patients with the necessary behavioral support to enable them to make the necessary changes.

The objective of this study is to guide future research in this field. It is of particular importance in terms of elucidating the high prevalence of migraine and in identifying individuals who have limited diagnosis, intending to improve the quality of life of these individuals and develop coping methods. This study primarily focused on the sociodemographic characteristics of participants, while physiological and biological variables were addressed only to a limited extent. This presents a constraint in understanding the underlying hormonal and neurophysiological mechanisms of menstrual migraine. Future research should incorporate more detailed assessments of biological processes related to the menstrual cycle. Specifically, laboratory-based analyses such as serum hormone levels, neurotransmitter profiles, and inflammatory markers could offer deeper insights into the pathophysiology of menstrual migraine. Moreover, the current sample was restricted to women in a university setting, which introduces homogeneity and limits the generalizability of the findings. Subsequent studies should aim to include women from diverse socioeconomic backgrounds, age groups, and educational levels. Such diversity would allow for a more comprehensive understanding of the societal distribution and multifactorial nature of menstrual migraine, including the interaction between biological and psychosocial determinants. Additionally, enhancing the detail and scope of survey instruments could improve the precision of self-reported data. More comprehensive questionnaires that capture menstrual cycle patterns, hormonal fluctuations, migraine timing, and severity would enable researchers to identify individual variations and triggering factors with greater accuracy. This would contribute to a more nuanced understanding of menstrual migraine and support the development of tailored intervention strategies.

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Author contributions ME, GB, ÇY, AD, NK and YÖG planned the study design. ME, GB, ÇY, AD, NK and YÖG contributed to the collection of data. ME performed the data analyses. ME, GB, ÇY, AD, NK and YÖG wrote the first draft of the article, which was revised and critically reviewed by all authors. All authors approved the final version.

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Declarations

Conflict of interest The authors declare no competing interests.

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