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ORIGINAL ARTICLE

A comprehensive assessment of headache characteristics, management, and burden of migraine in comparison with tension-type headache in Türkiye: Results of a cross-sectional survey of adult patients

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SUMMARY

Objectives: Migraine is a common cause of headache and a leading cause of morbidity in Türkiye. This study aimed to describe the clinical characteristics and management of migraine and to compare migraine with tension-type headache (TTH) regarding the burden of disease and healthcare resource utilization.

Methods: A total of 1368 patients (aged 18–65 years) with migraine or TTH were surveyed regarding sociodemographics, headache characteristics, clinical management, disease burden, quality of life, and healthcare resource utilization within the previous 12 months. Data from 1053 patients meeting the criteria for definite migraine (dMIG) or definite TTH (dTTH) were analyzed.

Results: The frequency and duration of attacks, the number of monthly headache days, days with analgesic consumption, and headache severity were significantly higher in dMIG compared to dTTH. Only 36.8% of definite migraineurs experiencing ≥4 monthly headache days were on preventive treatment. The negative impact on quality of life and economic loss were also higher in dMIG. Although more patients with dTTH visited a physician in the previous year, the number of physician visits was higher in dMIG. The groups were comparable regarding the percentage of patients who underwent radiological investigations due to headache; however, patients with dMIG had more brain magnetic resonance imaging and computed tomography scans.

Conclusion: Timely and accurate diagnosis and optimal management of migraine are crucial due to its significant burden. Educational programs for patients and healthcare providers, along with adherence to and persistence with preventive medications, may improve clinical outcomes.

Keywords: Burden of headache; migraine; tension-type headache.

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Introduction

Migraine (MIG) is a common and disabling disorder characterized by recurrent headaches of varying frequency, duration, and severity, and is a major reason for visiting physicians due to headache.[1,2] According to The Global Burden of Diseases (GBD) 2019 estimates, MIG affects more than one billion people globally. It is more common in women than in men and is mainly observed in young and middle age groups.[3] MIG was the second leading cause of disability worldwide in 2019 and caused, together with tension-type headache (TTH) and medication overuse headache, 5.4% (95% uncertainty interval [UI] 1.1–10.6) of total years lived with disability (YLDs).[4–6] MIG is more debilitating than TTH and, not surprisingly, the limitation and burden that MIG creates become more prominent as the duration and frequency of headache attacks increase.[7]

The burden of MIG on a person's life is not confined to its physical effects such as headache, nausea, vomiting, photophobia, and phonophobia experienced during the attacks. The constant fear of repeated headaches creates a high level of anxiety during the interictal period, impairs performance at work/school, daily activities, and social relations, ultimately decreasing the quality of life (QoL).[8–13] In order to avoid an attack, migraineurs try to keep their lives (regular sleep, avoidance of certain foods, etc.) and the environment (light, sound, smell, etc.) under control.[14]

MIG is less prevalent in childhood, adolescence, and late adulthood; its prevalence peaks between the third to sixth decades of life, the most productive period of life.[13,15,16] It has been reported that MIG can lead to low performance at work and school, resulting in missed career opportunities, low salary, and early retirement.[14]

Increased use of health services is another aspect of the burden on MIG sufferers, their families, and society. Previous studies have shown that healthcare resource use was high in MIG, especially in those with no response to preventive medications.[10,11,17]

MIG is a common cause of headache in Türkiye, with an estimated prevalence over 16%.[18,19] It was the leading cause of morbidity and accounted for 6% of the total YLD in 2013.[20] To date, the burden of MIG in Türkiye has not been largely studied. The analysis of local data from the global My Migraine Voice Survey indicated that the daily activities of patients were significantly limited during the headache phase, and 67% of actively working patients reported absenteeism and presenteeism.[21]

The aim of this study was to evaluate the social and economic burden that MIG imposes on adults and society in Türkiye, based on a survey applied to patients with definite MIG (dMIG) or definite TTH (dTTH). The study further aimed to describe the characteristics of MIG patients and understand how they are managed in a real-world setting.

Material and Methods

Study Settings and Participants

This was a multicenter, cross-sectional, non-interventional, face-to-face survey-based study in accordance with the principles of the Declaration of Helsinki. Ethics Committee approval numbered E-9756 were obtained from Istanbul University Cerrahpasa Medical Faculty Clinical Research Ethics Committee on January 13, 2020. The medical records of patients who underwent SELD for chronic low back pain and/or radicular pain from disc herniation were reviewed. Patients with headache, aged between 18–65 years, in whom the diagnosis of MIG or TTH had been made or confirmed by a physician in the previous 12 months were included in the study, from 15 cities across Türkiye. The data collection period was between January and September 2020.

A total of 1368 patients participated in the study: 427 participants were surveyed by neurologists at neurology outpatient clinics, whereas 941 volunteers were included via street interviews to ensure representation of patients with less frequent attacks who might not regularly visit neurologists. The street surveys were conducted by pollsters who had a one-day training about the study items. The volunteers were adequately informed and signed a written informed consent form before answering the questions. The participants were not subjected to any examination or investigation as part of the study.

Survey responses were evaluated by a designated investigator regarding the type of headache using

the International Classification of Headache Diseases-3 (ICHD-3) criteria and reclassified as necessary.[22] Patients who met both dMIG and dTTH diagnostic criteria were classified as dMIG. Overall, data from 1053 patients with dMIG or dTTH were included in the final analysis.

Study Instruments

The survey was specifically designed for the study and consisted of 5 parts (a total of 60 questions): patients' sociodemographics (age, gender, marital status, place of residence, level of education, employment status, household monthly income, and health insurance), headache characteristics (onset/frequency [low frequency (1–3 days/month), moderate frequency (4–7 days/month), high frequency (8–14 days/month), and chronic (>14 days/month)]/duration of attacks, type of diagnosing physician, allodynia, monthly headache days, monthly analgesic use), disease management (acute and preventive treatment use for headaches including class of medication, duration of treatment, and satisfaction with the drug [via a 5-point Likert scale: 1-not at all satisfied; 2-not satisfied; 3-neutral; 4-satisfied; 5-very satisfied]), additional measures to cope with headaches, concomitant diseases, and the burden (disability, QoL [overall, relations with family and friends], economic loss, and headache-related healthcare resource utilization [physician visit, admission to emergency department [ED], hospitalization, magnetic resonance imaging [MRI], and computed tomography [CT] for headaches] within the previous 12 months).

The validated Turkish version of the Migraine Disability Assessment (MIDAS) questionnaire was used to assess headache-related disability over the previous three months.[23] The MIDAS questionnaire included 5 items investigating the functional disability in three activity domains: school/work for pay, household work or chores, and family, social, and leisure activities. The MIDAS scores were graded as follows: grade 1 (0–5: little or no disability), grade 2 (6–10: mild disability), grade 3 (11–20: moderate disability), grade 4 (≥21: severe disability).[24]

The QoL was graded as not impaired, partially impaired, and fully impaired. Besides, the economic loss at a personal level was described as no loss, partial loss, and total loss.

Data Analysis

IBM SPSS 25 was used for the analysis. A type I error level of <5% was used to infer statistical significance.

Kolmogorov-Smirnov was used for testing normality. The Student t-test was used to compare independent groups for normally distributed numerical variables.

Patient characteristics (sociodemographic and disease-related) were analyzed using descriptive statistics (n, mean, SD [standard deviation] for continuous variables and frequencies and percentages for categorical variables). The Chi-Square Test (Pearson or Yates) was used for two and multiple group comparisons if chi-square conditions were met for independent categorical variables, and if conditions were not met, Fisher's Exact Test was used.

Results

Sociodemographic Characteristics

Table 1 summarizes the sociodemographic characteristics of the survey respondents.

Headache Characteristics

The distribution of dMIG and dTTH cases within the age groups revealed that dMIG dominated in all age ranges, in both females and males (Fig. 1).

The breakdown of patients with dMIG and dTTH according to age and gender is presented in Figure 2. The usual age of onset for MIG headaches was 16–20 years (Fig. 2a). The most prominent peak was apparent in female migraineurs between 41–45 years of age (Fig. 2b). Men and women with dTTH displayed a relatively homogeneous distribution across the age groups, while a preponderance of females over males was observed between 21–60 years of age in the dMIG group (Fig. 2b).

Table 2 compares the headache characteristics of patients with dMIG and dTTH. The duration that patients suffered from headaches, the frequency of attacks per month, the duration of attacks, the number of monthly headache days, and days with analgesic consumption were higher in dMIG than in dTTH ($p=0.005$ for the frequency of attacks and $p<0.001$ for the others). dMIG resulted in more severe head-

Table 1. Baseline sociodemographic characteristics of survey respondents (n=1368)

	n (%)
Gender	
Female	839 (61.3)
Male	529 (38.7)
AGE mean (SD), total	37.8 (12)
Education	
University	462 (33.8)
High school	540 (39.4)
Middle or primary school	365 (26.7)
Missing	40 (0.1)
Marital status	
Married	866 (63.3)
Single	428 (31.3)
Widowed	25 (1.8)
Divorced	47 (3.4)
Living with partner	2 (0.1)
Missing	1 (0.1)
Employment	
Yes	747 (54.6)
No	478 (35.0)
Student	111 (8.1)
Missing	32 (2.3)
Monthly income - Turkish Lira	
0–2,500	184 (13.4)
2,501–5,000	617 (45.1)
5,001-7,500	339 (24.8)
7,501–10,000	116 (8.5)
10,001–15,000	58 (4.2)
>15,0000	50 (3.7)
Missing	4 (0.3)
Health insurance	
SSI	1310 (95.8)
Banks/other institutions	5 (0.4)
Private	50 (3.7)
No insurance	31 (2.3)
Missing	2 (1.5)

n (%): Number of participants (percent); SD: Standard deviation; SSI: Social Security Institution; Turkish Lira (1 TL ~ 0,13 USD as of September 2020); *: Sevreal patients were covered by more than one insurance system.

aches compared to dTTH (p<0.001); the percentage of patients suffering from moderate to severe headaches was 96.7% and 70.6% in the respective arms. Approximately two-thirds of migraineurs (65.3%)

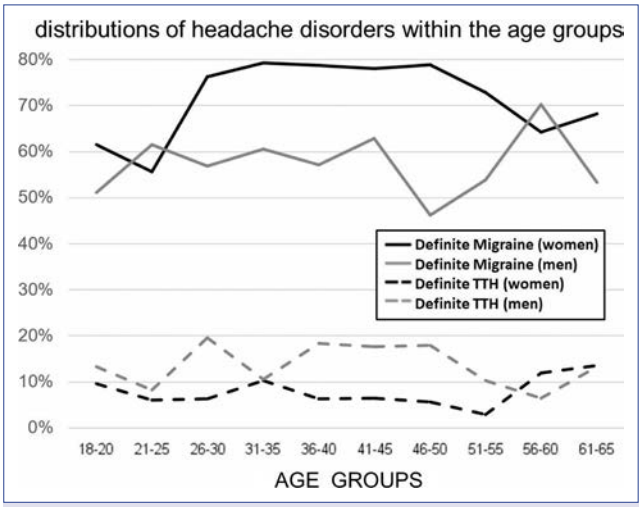

Figure 1. Distribution of dMIG and dTTH within the age groups.
dTTH: Definite tension-type headache; dMIG: Definite migraine.

had ≥4 headache days per month, and migraine headaches affecting >14 days per month were more common in dMIG (17.2%) than in dTTH (6.2%). Overall, the impact of migraine was significantly higher (p≤0.001) on females than on males, except for allodynia (p=0.67).

Diagnosis Process

Neurologists were the most visited physicians for headaches by dMIG (86.6%) and dTTH (72.9%) patients. They were followed by internists (dMIG: 24.2% and dTTH: 21.7%) and family physicians (dMIG: 17.4% and dTTH: 14.7%). The diagnosis was made by a neurologist in 88.5% and 76.0% of dMIG and dTTH patients, respectively.

The evaluation of responses by the designated investigator revealed that 40.9% (n=378) of patients with dMIG had been previously misdiagnosed as TTH; approximately 75% (n=283) of those patients had a history of <8 headache days/month (p<0.001). The percentage of dTTH patients who had been misdiagnosed as MIG was 13.2% (n=17).

Treatment

Approximately 95% (n=879) and 85% (n=110) of the respondents with dMIG and dTTH, respectively, reported the use of acute medications during headache attacks (p<0.001). The analgesic use (days/month) was higher in the dMIG group than in the dTTH group (7.1±7 days/month vs 4.4±5 days/month; p<0.001). Non-Steroidal Anti-Inflam-

Table 2. Headache characteristics of patients with definite migraine or TTH

	Definite migraine				Definite TTH				
	Female n=614 Mean (SD)	**Male n=310 Mean (SD)**	**p***	**Total n=924 Mean (SD)**	**Female n=60 Mean (SD)**	**Male n=69 Mean (SD)**	**p***	**Total n=129 Mean (SD)**	**Migraine vs. TTH p***
Headache years	12.4 (10)	8.8 (8)	<**0.001**	11.2 (9.6)	6.3 (6)	4.5 (5)	**0.045**	5.3 (5)	<**0.001**
Attack frequency/month	6.8 (7)	5.3 (5)	<**0.001**	6.3 (7)	4.4 (4)	5.4 (5)	0.23	5 (5)	**0.005**
Attack duration (hours)	35.8 (7)	20.1 (62)	**0.001**	30.5 (68)	6.4 (10)	8.7 (18)	0.36	7.6 (15)	<**0.001**
Headache days/month	8.5 (8)	6.1 (6)	<**0.001**	7.7 (7)	4.3 (1)	6.4 (5)	**0.003**	5.3 (4)	<**0.001**
Days with analgesics/month	7.6 (7)	6.1 (5)	**0.001**	7.1 (7)	4.1 (5)	4.6 (5)	0.55	4.4 (5)	<**0.001**
	n (%)	**n (%)**		**n (%)**	**n (%)**	**n (%)**		**n (%)**	
Headache days/month			<**0.001****				**0.04****		**0.001****
1/3 days	194 (31.6)	127 (41.0)		321 (34.7)	34 (56.7)	30 (43.5)		64 (49.7)	
4/7 days	151 (24.6)	88 (28.4)		239 (25.9)	14 (23.3)	16 (23.2)		30 (23.3)	
8–14 days	138 (22.5)	67 (21.6)		205 (22.2)	12 (20.0)	15 (21.7)		27 (20.9)	
>14 days	131 (21.3)	28 (9.0)		159 (17.2)	0 (0.0)	8 (11.6)		8 (6.2)	
Allodynia	480 (78.2)	238 (76.8)	0.67***	718 (77.7)	42 (70.0)	38 (55.1)	0.10***	80 (62.0)	<**0.001****
Headache severity			<**0.001****				0.61**		<**0.001****
Mild	15 (2.4)	14 (4.5)		29 (3.1)	17 (28.3)	21 (30.4)		38 (29.5)	
Moderate	288 (46.9)	199 (64.2)		487 (52.7)	43 (71.7)	47 (68.1)		90 (69.8)	
Severe	311 (50.7)	97 (44.2)		408 (44.2)	0 (0.0)	1 (1.4)		1 (0.8)	

n: Number of respondents; TTH: Tension type headache; SD: Standard deviation; *: Independent two samples T test (non-equal variances); **: Pearson Chi-spuare test, two-tailed; ***: Fisher's Exact Test, two-tailed.

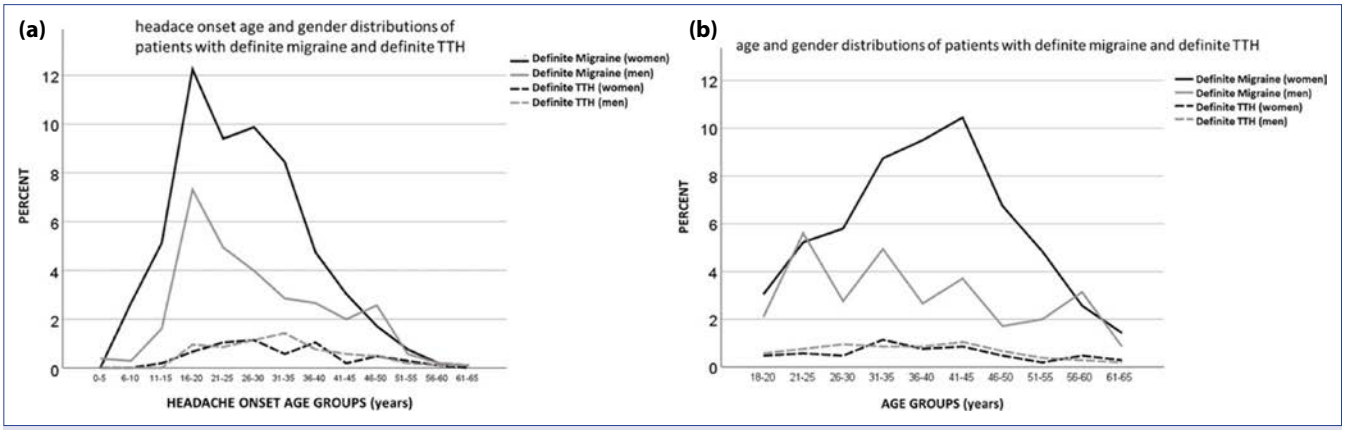

Figure 2. Distribution of patients with dMIG and dTTH according to age and gender.

matory Drugs (NSAIDs) were the most commonly used attack medications by dMIG (n=705; 80.3%) and dTTH (n=82; 73.9%) patients. Triptans (30.1%) and simple analgesics (paracetamol/metamizole) (41.1%) ranked second in the respective arms. Other types of drugs that patients with dMIG used for headaches included simple (22.2%) or combined analgesics (11.7%), ergot derivatives (17.4%), and opioids (0.1%).

Overall, the proportion of patients who reported benefit from acute medications was similar in the study groups (p=0.295): total relief of headache was achieved in 42.1% (n=370) and 49% (n=49) of acute medication users in the dMIG and dTTH groups, respectively. However, the proportion of patients benefiting from acute treatment differed significantly across the study arms when the frequency of attacks was taken into consideration

(p<0.001). The percentage of dMIG patients who benefited from acute medications decreased as the monthly headache days increased: 70.9% (1–3 days), 35.9% (4–7 days), 22.1% (8–14 days), and 18.1% (>14 days). A decreasing pattern was also observed in the dTTH group except for patients with headache frequency >14 days per month: 56.1% (1–3 days), 46.2% (4–7 days), 10% (8–14 days), and 42.9% (>14 days).

One-fifth of patients with dMIG (n=176) and dTTH (n=23) who were on acute headache medications (dMIG: 876 and dTTH: 110) were "very satisfied" with these drugs. The distribution of these patients considering the monthly headache days did not differ between the study groups (p=0.330). In the dMIG arm, satisfaction was highest (40.7%) in patients with the lowest monthly headache days (1–3 days) and reduced as the headache days increased: 14.3% (4–7 days), 6.5% (8–14 days), and 4.2% (>14 days). The percentage of patients with dTTH who were "very satisfied" with their acute medications was 22.8% (1–3 days), 30.8% (4–7 days), 5.0% (8–14 days), and 14.3% (>14 days).

Forty percent (n=370) and 14% (n=18) of dMIG and dTTH patients, respectively, reported the use of preventive medications (p<0.001). Among 603 patients with dMIG who experienced ≥4 monthly headache days, 222 (36.8%) were on preventive treatment. Figure 3 shows the distribution of dMIG patients according to their preventive medications. Antidepressants were the most commonly used preventive medications (74.6%; n=276), followed by antiepileptics (19.2%; n=71) and beta blockers (19.5%; n=72). Selective serotonin reuptake inhibitors (SSRIs) were the preferred class of prophylactic medication in dMIG (48.1%; n=178). Botulinum toxin injection and nerve block were applied to 7.6% (n=28) and 3.0% (n=11) of dMIG patients, respectively. Most dTTH patients on preventive medication were receiving antidepressants (77.8%; n=14), primarily SSRIs (55.6%; n=10), for headache prophylaxis.

Around 22% (n=82) and 18% (n=3) of patients with dMIG and dTTH (n=23) who were receiving prophylactic medications were "very satisfied" with their treatment (p=0.142). The percentages of dMIG patients who were "very satisfied" with their preventive

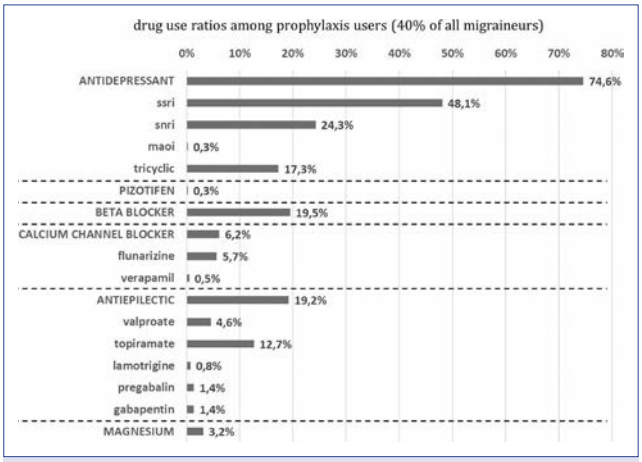

Figure 3. Preventive medications used by dMIG patients (n=370; patient %).

ssri: Selective serotonin reuptake inhibitor; snri: Selective serotonin noradreneline reuptake inhibitor; maoi: Monoamine oxidase inhibitor.

treatment according to the monthly headache day categories were: 34.7% (1–3 days), 21.4% (4–7 days), 8.6% (8–14 days), and 13.5% (>14 days).

Most dMIG patients reported that the preventive medications reduced the severity (88.1%), duration (81.1%), and number (79.2%) of headache attacks and improved their QoL (83.2%).

Additionally, all patients with dMIG reported that they were careful not to starve to cope with their headaches. Adjusting the light (63.3%) and sound (62.0%), sleeping regularly (60.6%), and drinking plenty of fluids (53.2%) were other common measures taken by dMIG patients. Mechanical compression on the head using a wrap was applied by 42.6% of dMIG patients to reduce the intensity of the headache. Definite migraineurs also reported the use of several complementary and alternative methods for prevention such as cupping (14.1%), acupuncture (9.2%), meditation/breath exercises (8.2%), and hirudotherapy (4%).

Concomitant Diseases

Depression (22.8%) and anxiety disorder (13.9%) were the most frequently reported concomitant diseases in patients with dMIG, followed by hypertension (12.1%). The top three ranked concomitant diseases were sinusitis (11.6%), depression (10.9%), and asthma (7.0%) in the dTTH cohort. Depression and anxiety (2.3%) were significantly less common in dTTH than in dMIG (p<0.001).

Table 3. MIDAS scores and grades in patients with dMIG and dTTH

	dMIG (n=882)	dTTH (n=119)	p
Headache days*	18.9±19	13.2±12	<**0.001****
Days with no household work because of headaches*	6.3±10	3.4±5	<**0.001****
Days in which productivity in household work reduced by half or more because of headaches*	6.7±11	2.8±3	<**0.001****
Days in which work or school was missed because of headaches*	1.7±6	1.4±2	0.246**
Days in which productivity at work or school reduced by half or more because of headaches*	4.0±9	1.6±2	<**0.001****
Days in which family, social or leisure activities were missed because of headaches*	6.1±11	1.4±3	<**0.001****
MIDAS score (total)	24.7±40	10.6±12	<**0.001****
MIDAS grades, n (%)			
Grade 1 (little or no disability)	224 (25.4)	48 (40.3)	
Grade 2 (mild disability)	169 (19.2)	23 (19.3)	<**0.001*****
Grade 3 (moderate disability)	193 (21.9)	29 (24.4)	
Grade 4 (severe disability)	296 (33.6)	19 (16.0)	

*: In the last 3 months; **: Independent two sample t test (unequal variances); ***: Pearson chi-square, two-tailed; dMIG: Definite migraine; dTTH: Definite tension-type headache; n: :umber of participants; MIDAS: Migraine disability assessment test; SD: Standard deviation.

Disability Assessment

The MIDAS scores and grades revealed that headaches were more disabling in dMIG than in dTTH. The functional impairment caused by dMIG was more significant than dTTH in all activity domains except for missed work or school days (Table 3).

MIG headache was more disabling for women than for men: the total MIDAS score (mean±SD) was 28.3±40 in females and 17.6±30 in males with dMIG (p<0.001). Little or no disability (grade 1) was reported by 22.8% and 30.6% of female and male patients with dMIG, respectively, while severe disability (grade 4) was more common in women than in men (38.4% vs. 23.7%; p<0.001).

As shown in Figure 4, more than half of the dMIG patients who had low-frequency (1–3 days) migraine (53.7%; n=159) reported little or no disability (grade 1 MIDAS score), whereas 75.6% (n=18) of those with an attack frequency of >14 days per month were severely disabled (grade 4 MIDAS score).

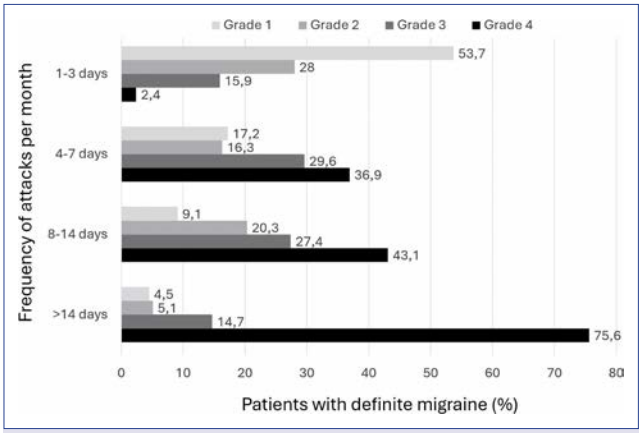

Figure 4. MIDAS scores of patients with migraine according to attack frequency.

MIDAS: Migraine disability assessment test.

Quality of Life and Economic Loss

The impact of headaches on QoL showed a significant difference between dMIG and dTTH patients (p<0.001). The QoL was either partially or fully impaired in 95.3% and 84.5% of patients with dMIG and dTTH, respectively. More patients with dMIG reported having partially or fully impaired relations with friends (55.9% vs. 38.8%) and family members (69.5% vs. 48.1%). Among definite migraineurs, the impairment in QoL and relationships with friends and family members was greatest in patients with high-frequency (>14 days/month) attacks (Fig. 5).

Economic loss was reported by 37.7% and 21.8% of patients with dMIG and dTTH, respectively (p<0.001).

Table 4. Healthcare resource use due to headaches within the previous 12 months according to monthly headache days

	1–3 days /month		4–7 days /month		8–14days /month		>14 days /month	
	dim n=321 (%)	dTTH n=64 (%)	dMIG n=239 (%)	dTTH n=30 (%)	dMIG n=205 (%)	dTTH n=27 (%)	dMIG n=159 (%)	dTTH n=8 (%)
Physician visits	170 (53.0)	51 (79.9)	204 (85.4)	28 (93.3)	195 (95.1)	26 (96.3)	148 (93.1)	7 (87.5)
Brain MRI	75 (23.4)	24 (37.5)	77 (32.2)	11 (36.7)	90 (43.9)	16 (59.3)	85 (53.5)	3 (37.5)
Cervical MRI	56 (17.4)	14 (21.9)	36 (15.1)	7 (23.3)	35 (17.1)	4 (14.8)	44 (27.7)	–
Brain CT	13 (4.0)	5 (7.8)	24 (10.0)	3 (10.0)	22 (10.7)	–	29 (18.2)	–
Admission to ED	56 (17.4)	13 (20.3)	90 (37.7)	8 (26.7)	106 (51.7)	10 (37.0)	101 (63.5)	3 (37.5)
Hospitalization	10 (3.1)	–	12 (5.0)	–	20 (9.8)	–	23 (14.5)	–

CT: Computer tomography; dMIG: Definite migraine; dTTH: Definite tension type headache; ED: Emergency department; MRI: Magnetic resonance imaging; n: Number of participants.

Table 5. Healthcare resource use due to headaches within the previous 12 months

	dMIG	dTTH	p
Physician visit (patients %)	77.6	86.8	**0.016**
How many times, mean±SD	3.5±5	1.7±1	<**0.001**
Brain MRI (patients %)	35.4	41.9	0.171
How many times, mean±SD	1.3±1	1.1±0	**0.020**
Cervical MRI (patients %)	18.5	19.4	0.810
How many times, mean±SD	1.1±0	1.0±0	0.080
Brain CT (patients %)	9.5	6.2	0.255
How many times, mean±SD	1.2±1	1.0±0	**0.003**
Admission to ED (patients %)	38.2	26.4	**0.009**
How many times, mean±SD	5.2±10	1.6±1	<**0.001**
Hospitalization (patients %)	7.0	0	–
How many times, mean±SD	1.2±1	0±0	–
Length of stay (days), mean±SD	2.8±4	0±0	–

CT: Computerized tomography; dMIG: Definite migraine; dTTH: Definite tension type headache; ED: Emergency department; MRI: Magnetic resonance imaging; SD: Standard deviation.

As shown in Figure 5, patients who reported total economic loss displayed an increasing trend with regard to the frequency of attacks per month.

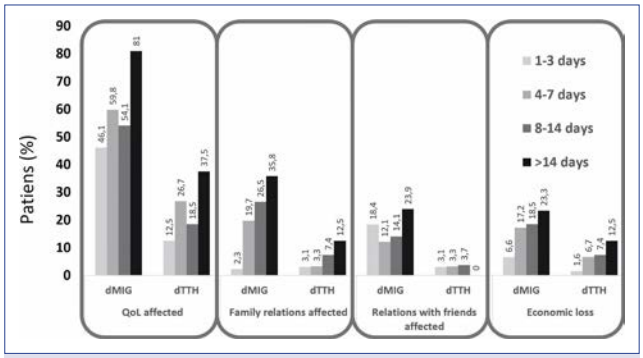

Figure 5. Impact on quality of life, relations with friends and family, and economic loss according to monthly headache days.

Healthcare Resource Use

Over 90% of patients in both study arms were under the coverage of National Health Insurance provided by the Social Security Institution.

As shown in Table 4, the use of healthcare resources due to headaches within the previous 12 months was commonly reported by both patients with dMIG and dTTH. Hospitalization was only required in dMIG, and hospital admission showed an increasing pattern according to the frequency of attacks per month.

Table 5 summarizes the various healthcare services used by the patients in the dMIG and dTTH arms within the previous 12 months. The percentage of patients with dTTH who reported having visited a physician was significantly higher than that of dMIG (86.8% vs. 77.6%; p=0.016), but the number of physician visits in the dMIG group was almost twice the number in the dTTH group (3.5±5 vs. 1.7±1; p<0.001). The groups were comparable regarding the percentage of patients who had a radiological investigation due to headache, but the number of brain MRI and CT scans was significantly higher in the dMIG group (p<0.020 and p<0.003, respectively).

Discussion

This face-to-face, comprehensive survey conducted on a large group of participants compared MIG and TTH regarding headache characteristics and revealed the high impact of MIG headaches on various domains of life and healthcare resource use.

Our study showed that a significant proportion of patients with dMIG (40.9%) had been previously diagnosed as TTH. The potential explanations for this discrepancy might include the inability of symptoms to meet the diagnostic criteria of "dMIG" during previous physician evaluations, the variable nature of MIG, or the conversion between MIG and TTH.[25,26] Similar to our findings, Ertas et al.[19] reported that 22.8% of dMIG patients had a previous diagnosis of tension-type or psychogenic headache, whereas 37.1% of dTTH patients had been previously diagnosed as sinusitis. In that study, 1.1% of patients with dTTH were reported to be misdiagnosed as MIG. This misdiagnosis may have important clinical consequences, as it could prevent MIG patients from being appropriately treated. Inadequately treated episodic migraine (EM) may progress to a chronic form of the disease, or chronic migraine (CM) outcomes may worsen, leading to increased disability.[27,28]

In the present study, MIG mainly affected young and middle-aged adult women (most prevalent between 41–45 years), whereas TTH displayed an almost flat distribution across genders and age groups, in line with previously published data.[19] This observation deserves attention since people are socially and professionally most active and productive during this period of life and shape prospects for their future.[6,16]

It is also noteworthy that MIG was the second leading cause of disability in patients aged 15–49 years according to GBD 2019 data and ranked first among females in this age group.[4–6]

There are conflicting findings about the characteristics of MIG headaches in the literature. We found that the frequency and duration of headache attacks, the average monthly headache days and analgesic use (days per month), and the severity of headaches reported by women with dMIG were significantly higher than those reported by men. However, the Turkish Prevalence Study conducted in 2008 did not identify a difference across genders regarding the frequency of attacks, the monthly headache days, and the severity of headaches, although numerical differences favoring females were observed. In contrast to our results, allodynia was more common in men than in women in that study. The authors reported that the attacks lasted longer in female patients, consistent with our findings.[19]

In the Migraine in America Symptoms and Treatment (MAST) Study, monthly headache days and cutaneous allodynia were reported to be higher in women than in men, but there were no significant differences regarding many headache-related variables across genders.[29] Although greater headache-related disability and higher healthcare resource utilization were reported in the American Migraine Prevalence and Prevention (AMPP) Study, the differences regarding headache characteristics were not prominent across genders.[30] Similarly, a population-based headache study from Korea did not reveal a difference between males and females in terms of frequency, severity, and impact of headaches.[31]

The differences in study designs, methods, and settings, the definition of migraine, study populations (migraine, probable migraine, definite migraine), and the changing cultural and sociodemographic characteristics over time and across countries may at least partly explain the conflicting findings across these studies.

The comparison of headache characteristics of migraineurs in the study by Ertas et al.[19] with those of our study revealed that the mean number of attacks per month was around 6 in both studies, and the

monthly headache days were slightly higher (6.2 vs. 7.7) in our study. However, the mean duration of attacks was shorter (35 vs. 30 hours), the percentage of patients with severe headaches (54.2% vs. 44.2%), and of those experiencing headaches >14 days was lower (17% vs. 10.9%) in our study.[19] Baykan et al.[32] also reported in 2007 that 56.1% of their outpatients with MIG suffered from severe headaches. In regard to the results of these two previous studies, our study suggests an improvement in the severity and chronicity of headaches, which may be attributed to increased awareness and more effective management of MIG over the intervening 12-year period.[19,32] Nevertheless, the magnitude and intensity of symptoms should not be underestimated, as >95% of patients with dMIG in our study reported having had moderate or severe attacks, whereas 65.3% and 40% experienced ≥4 and ≥8 headache days a month, respectively.

To our knowledge, the characteristics of patients with dMIG and dTTH have not been largely investigated in comparative studies so far. In the current study, the frequency and severity of headaches, the mean number of monthly headache days, and the percentage of patients reporting allodynia were higher in dMIG than in dTTH. Gupta and Bhati,[33] in their cross-sectional study where they described and compared the characteristics of patients with MIG and TTH, reported results comparable to those of our study.

Most patients in Western countries visit primary care units for headaches and are commonly diagnosed and treated by primary care physicians.[34–36] However, neurologists were the most visited physicians for headaches in our study, followed by internists and primary care physicians, in line with previously reported data from Türkiye.[19] The order was the same for the diagnosis of both TTH and MIG. The major reason for the difference between Türkiye and many other countries may be the local healthcare system in Türkiye, which allows direct admission to secondary or tertiary clinics.

In our study, we found that 95.1% of participants with dMIG were receiving acute treatment for their headache attacks (mean: 7.1 days/month). Studies in Türkiye and abroad consistently reported high rates of attack medication use varying between 87% and 98%.[21,29,30] Primary headache sufferers most frequently used NSAIDs for acute treatment in the current study; less than one-third (30.1%) of patients with dMIG were on triptans. Compared with the Turkish prevalence study conducted in 2008, which reported triptan use in 2.9% of patients, our findings indicate that the use of triptans, which are specific acute medications for MIG, has increased over the years and approached that of NSAIDs.[19] Unlike local findings from Türkiye, real-life data from Europe and the USA revealed that triptans were the most commonly used attack medications.[13,37]

We observed that only 36.8% of patients with dMIG who had ≥4 headache days a month reported using preventive medications, although guidelines recommend considering prophylaxis for this patient population.[38,39] The reported rate was higher than the one in a previously published local epidemiological study (4.9% of migraineurs) conducted in 2008.[19] Our finding may reflect increased awareness about preventive medications among patients and healthcare providers and the availability of new treatment options over time, but the potential differences in various study populations should not be disregarded. In the survey-based International Burden of Migraine Study II (IBMS-II), it was reported that 28.3% of patients with EM and 44.8% of patients with CM were using preventive treatment.[8] Additionally, a retrospective Claims Database Analysis revealed that persistence with the initial oral prophylactic medication among patients with chronic MIG was only 25% at month 6 and worsened after switching to a new preventive drug.[40] Based on the presented data, it is clear that there is an unmet need regarding the appropriate use of preventive medications in MIG. Since low tolerability and suboptimal effectiveness are major barriers to the long-term use of conventional preventive therapies, the introduction of new treatment options addressing these unmet needs may contribute to increasing persistence with MIG prophylaxis, thereby improving patient outcomes.[41]

In this study, we observed that patients with dMIG mostly used antidepressant (74.6%) drugs, mainly SSRIs and serotonin-norepinephrine reuptake inhibitors (SNRIs), as preventive treatment. Depression (22.8%) and anxiety (13.9%) were the two most common comorbidities in our dMIG population, in

line with the literature.[11,42] The high rates of these disorders in our dMIG population may explain the preference for antidepressant use, as well as the suggested role of neurotransmitters in the development of headaches.[43]

Our study showed that complementary and alternative methods such as acupuncture, hirudotherapy, cupping, and meditation were used by up to 14.5% of patients with dMIG. It is noteworthy that only 7.8% of patients reported keeping diaries in our study. This represents a key area of improvement for better disease management.

The present study revealed that the burden of MIG headaches on various domains of life was greater than that of TTH, as shown by the total MIDAS scores, which were 24.7±40 and 10.6±12 in the respective groups ($p<0.0001$). Consistent with the literature, in our study, MIG-related disability increased in parallel with the increase in the monthly frequency of headache attacks, as clearly shown by the lower percentage of patients with MIDAS grade III and IV (18.3%) in the low-frequency EM (1–3 days/month) subgroup compared to the CM (>14 days/month) subgroup (90.3%).[44,45] We also found that the limitations imposed by MIG were greater on females than on males, in line with many previous observations.[12,29–31] Overall, our findings were consistent with several large-scale studies from various geographies regarding the negative effects of MIG on relationships with friends and family members, leisure activities, and financial situations.[8,9,11,12,21,44,45]

In the current study, 46.1% of MIG patients in the low-frequency EM (1–3 days/month) group and 81% of those with CM (>14 days/month) reported that their QoL was "fully impaired." This finding aligns with the real-life observation by Guitera et al.,[46] who reported that "the chronicity of headache rather than its intensity impaired the QoL". In the CAMEO study, patients with CM were almost twice as likely to state that they would have a better life in the absence of MIG compared to patients with EM.[9] Similar to the findings from the CAMEO study, in our study, more patients with dMIG suffering from chronic headaches (>14 days/month) reported that MIG had a negative impact on relationships with friends and family and their personal financial situations.[9]

The present study also confirmed the high healthcare resource utilization by MIG patients and displayed an increasing trend in patients with more monthly headache days, as reported in previous studies.[11,21] Very recently, Newman et al.[47] emphasized that healthcare resource use was higher in migraineurs with previous treatment failures and further increased in patients with a high number of previous treatment failures. Vo et al.[17] pointed out that the regular use of preventive treatment contributed to improved healthcare-related costs in MIG. These findings underline the importance of timely and proper management in MIG to improve clinical outcomes and reduce the economic burden of the disease.

Strengths and Limitations

The major strength of this study was the inclusion of both MIG and TTH patients, which allowed a direct comparison of these two types of primary headaches. Secondly, patients with TTH and low-frequency MIG who do not usually visit neurology clinics were also surveyed, thereby contributing to the representativeness of the overall primary headache patient population in Türkiye. To minimize diagnostic uncertainty, all survey responses were reviewed by a designated investigator in terms of the ICHD-3 diagnostic criteria for MIG and TTH.

The current study has some limitations that need to be considered. First, the study relies on patient-reported data, which might have resulted in reporting and recall biases. Secondly, clinical fluctuations may occur during the course of MIG and TTH. Comorbid conditions and the loss of some distinctive accompanying features (such as vomiting, photophobia, and phonophobia) of MIG with chronification may cause difficulty in differentiating headache types.

Conclusion

The findings of the current study have several implications for clinical care. They emphasize the crucial importance of timely and accurate diagnosis in addition to optimal treatment management of MIG headaches. Education programs for patients and healthcare providers, as well as adherence to and persistence with preventive medications in patients with more than 4 monthly headache days, may improve the disease course.

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