RESEARCH ARTICLE

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The Association between Migraine and Sleep Quality

ABSTRACT

Objective: Migraine and sleep disorders are common health problems in the community and cause loss of labor. There are studies showing that there is a relationship between migraine and sleep quality and these two conditions worsen each other. The aim of this study was to determine the relationship between migraine and sleep quality.

Methods: This is a case-control type cross-sectional study consisting of a total of 454 participants, included migraine patients, patients with non-migraine headaches and patients without headache complaint admitted to Family Medicine outpatient clinics between October 2017 and March 2018. Sociodemographic data form, Identity Migraine test, International Headache Society diagnostic criteria questionnaire, Pittsburgh sleep quality scale (PSQI) and Epworth day sleepiness scale (Epw) were applied to the participants by face to face interviews.

Results: The total PSQI score was 6.5 ± 3.1, and significantly different between the groups. Patients with diagnosis of migraine had a higher PSQI score and poor sleep quality rate than the control groups. There was no correlation between the frequency of migraine attacks and PSQI scores. Extreme sleepiness in day time for the migraine group (30.7%) was higher than the control groups and there was no correlation between the frequency of migraine attacks and Epw scores.

Conclusions: Poor sleep quality and daytime sleepiness rates in migraine patients were higher than those with non-migraine headache patients and patients without headache complaints. This may be due to the fact that migraine is a specific problem affecting sleep or the frequency and severity of headache in the migraine patients are greater than that of the non-migraine headache patients and headache-free participants.

Keywords: Headache, Migraine, Sleep Quality, Daytime Sleepiness, Epworth Sleepiness scale, PSQI.

Migren ve Uyku Kalitesi Arasındaki İlişki

ÖZET

Amaç: Migren ve uyku bozuklukları toplumda sık görülen ve iş gücü kaybına neden olan sağlık sorunlarıdır. Migren ile uyku kalitesi arasında bir ilişki olduğunu ve bu iki durumun birbirini kötüleştirdiğini gösteren çalışmalar mevcuttur. Bu çalışmanın amacı migren ile uyku kalitesi arasındaki ilişkiyi belirlemektir.

Gereç ve Yöntem: Vaka kontrol tipindeki kesitsel çalışmamız Ekim 2017-Mart 2018 tarihleri arasında Aile Hekimliği polikliniklerine başvuran migren tanılı hastalar, migren dışı baş ağrısı olan hastalar ve baş ağrısı şikayeti olmayan hastalar olmak üzere toplam 454 katılımcıyla yürütüldü. Sosyodemografik Veri formu, Kimlik Migren testi, Uluslararası Baş Ağrısı Derneği tanı kriterleri anketi, Pittsburgh uyku kalitesi ölçeği (PSQI) ve Epworth gündüz uykululuk ölçeği (Epw) katılımcılara yüz yüze görüşme yoluyla uygulandı.

Bulgular: Toplam PSQI skoru 6.5 ± 3.1 idi ve gruplar arasında istatistiksel olarak anlamlı fark vardı. Migren tanılı hastaların, kontrol gruplarına göre daha yüksek PUKİ puanı ve kötü uyku kalitesi oranı vardı. Migren ataklarının sıklığı ile PUKİ puanları arasında istatistiksel olarak anlamlı bir ilişki yoktu. Migren grubunda gündüz aşırı uyku hali (%30.7) kontrol gruplarına göre daha yüksekti ve migren ataklarının sıklığı ile Epw skorları arasında anlamlı ilişki saptanmadı.

Sonuç: Migren hastalarında kötü uyku kalitesi ve gündüz uykulu olma oranları, migren olmayan baş ağrısı hastalarına ve baş ağrısı şikayeti olmayanlara göre daha yüksekti. Bunun nedeninin migrenin uykuyu etkileyen spesifik bir problem olması veya migren hastalarında baş ağrısının sıklığının ve şiddetinin, migren olmayan baş ağrısı hastalarına ve baş ağrısı olmayanlara göre daha fazla olduğu düşünülebilir.

Anahtar Kelimeler: Baş Ağrısı, Migren, Uyku Kalitesi, Gündüz Uykululuğu, Epworth Uykululuk Ölçeği, PSQI.

INTRODUCTION

Migraine, which is characterized by periodic, usually unilateral pain, is a headache syndrome that can start in childhood, adolescence or early adulthood, and shows varying frequency and familial characteristics in later years (1). Migraine ranked second among the diseases that caused the most functional loss in 2016 due to its effects that can limit the person (2). It is a disease characterized by throbbing headaches, as well as some neurological, gastrointestinal and autonomic symptoms (2). According to the frequency of attacks, it is classified as light migraine (1-4 attacks per month), moderate migraine (5-8 attacks per month), severe migraine (9-14 attacks per month), and chronic migraine (> 14 attacks per month) (3).

Etiopathogenesis of migraine is defined as a neurovascular reaction caused by specific external stimuli or frequent changes in the central nervous system (4). Stress, mental tension, insomnia, hunger, fatigue and noise are known as the most common triggering factors of migraine (5). The diagnosis is based on the character of the headache and the accompanying symptoms (6). Four stages of migraine have been identified and these consist of prodromal period, aura, headache, and recovery (7).

The worldwide prevalence of migraine have been reported to be 5%, while in Turkey it ranges between 5% -20% and the average has been reported as 16.4% (8, 9). The prevalence was reported to be 15% in Çanakkale, the city where the study was conducted (10).

Sleep, a natural process that provides energy conservation, development and repair of the nervous system in all mammals, associates with many components of a biological structure, especially the nervous system controlling intracellular mechanism stimulation, automatic functions, behavior, and cognitive functions (11). Poor sleep quailty is considered among the factors that trigger migraine (5).

In the biological rhythm and its formation, the sleep-wake cycle influenced by the circadian rhythm that's formed with the repetition of 24-hour stages is decisive. The circadian rhythm is regulated by the suprachiasmatic nucleus in the anterior hypothalamus (12). 7.5-8 hours of sleep is sufficient for adults (13). Sleep deprivation or interruption may cause fatigue, drowsiness, headache, anxiety, impaired concentration, confusion, perception disorder, learning disability, developmental delay, health problems and an increase in accidents (14). The prevalence of sleep disorders in the population ranges from 10% to 30% (15).

There is a complex relationship between headaches and sleep disorders. It cannot be clearly elucidated whether sleep disorders cause headache or headache causes sleep disorders (16). Some studies show that poor sleep quality triggers migraine or intensifies migraine attacks. Sleep disorders are often reported as migraine triggers, but further studies are needed to better understand the relationship between these entities (17).

The aim of this study was to investigate the sleep quality of patients admitted to a local tertiary hospital, as well as to compare and determine the effect of the sleep quality of patients diagnosed with migraine and those with non-migraine headache and headache-free.

MATERIAL AND METHODS

Population and Sample: The population of the study, which is an epidemiological study in case-control type, consists of individuals between the ages of 18-65 who admitted to Çanakkale Onsekiz Mart University Research and Practice Hospital Family Medicine outpatient clinics between October 1, 2017 and March 30, 2018.

The study was carried out in the case group of migraine patients and two control groups: with non-migraine headaches and without headache (no primary or secondary headaches and less than 6 headaches per year).

1564 people were questioned for headaches to determine the participants.1077 individuals did not agree to participate in the study. 487 individuals who agreed to participate in the study and gave written consent, were included in the study and interviews were conducted through face to face. 33 participants were excluded due to missing data. The study was completed with a total of 454 participants, 150 in the migraine group, 155 in the non-migraine group and 149 in the headache-free group. Migraine group was divided into 4 subgroups as mild, moderate, severe and chronic migraine.

Patients aged 18 and 65, who agreed to participate in the study and did not meet the exclusion criteria, were included in the study. Patients, who did not agree to participate in the study or those with pregnancy/breastfeeding, a history of analgesic abuse (more than 15 analgesic use in the last month), craniospinal surgery, neck trauma, craniocervical vascular/non-vascular disease, and a diagnosis of a disease that may impair the perception of reality, substance abuse or withdrawal, active infection, homeostasis disorders, psychiatric disorders, and cranial neuralgias that could cause secondary headaches, were excluded from the study.

Ethics approval was obtained from the Committee of ÇOMU Clinical Research Ethics on 07/06/2017 (E.61936) and carried out according to the requirements of the Declaration of Helsinki.

Data Collection Tools

Sociodemographic Data Form: This form consists of questions about date of birth, gender, educational status, marital status, occupation, work, smoking, exposure to cigarette smoke, alcohol use, and daily coffee consumption. The form was

prepared by the researchers and applied to each participant.

Identity (ID) Migraine Test: ID Migraine Test was developed in 2003 by Lipton in the US to facilitate the diagnosis of migraine patients, especially in primary health care units (18). The sensitivity, specificity and positive predictive value of the ID Migraine Test were found to be as 81%, 75%, and 93%, respectively. Turkish valid and reliable version of this test was used in our study (19). 2 questions were asked before the screening of patients with headache in the last 3 months. These questions were: "Do your headaches affect your work, school or entertainment life?" and "Did you think you should talk to your doctor for your headache?". ID Migraine Test is applied to those who answer yes to any of these questions. The test contains questions related to at least one daily restraint because of nausea, photosensitivity and pain (19). Those who answer 2 or more "yes" to the questions in this test are considered positive.

International Headache Society (IHS) Diagnostic Criteria: In our study, the diagnostic criteria determined by IHS were used to confirm or to exclude the migraine diagnosis of the patients. Four questions were added to the questionnaire by the researchers, including the frequency of migraine attacks, disease duration, history of drug use, and visual pain scale.

Pittsburgh Subjective Sleep Quality Scale (PSQI): PSQI is a self-report scale that assesses sleep quality over a one-month period. PSQI was developed by Buysse and his colleagues in 1989 and has been shown to have adequate internal consistency, test-retest reliability, and validity (20). The validity and reliability of the index in Turkey had been determined by Ağargün, Kara, and Anlar and it was stated to be suitable for Turkish society. Cronbach alpha internal consistency coefficient was found to be 0.80. In the evaluation of PSQI, 18 items participate in the scoring. PSQI has 7 components, including subjective sleep quality, sleep delay, sleep time, habitual sleep activity, sleep disturbance, sleep medication use, and daytime dysfunction. The sum of the scores of these components constitute the total PSQI score. The total score has a value ranging between 0-21. If the total PSQI score is ≤5, it indicates good sleep quality, and >5 indicates poor sleep quality (21).

Epworth Sleepiness Scale: It is an 8-item scale which questions the general level of daytime sleepiness of the individual. Epworth Sleepiness Scale aims to evaluate the chance of falling asleep or drowsiness in daily life (22). Each item is scored between 0-3 points. The total score has a value between 0-24. Participants with an Epworth score of >9 are considered to be those with a tendency to daytime sleepiness (22).

Statistical Analysis: The frequency and distribution status of the variables were examined, and the adaptations of the continuous variables to the normal distribution were checked. According to the characteristics of the groups, the chi-square, the differences in the means of independent samples, variance analysis tests, correlation tests, and the participants' Pittsburgh and Epworth scores were compared. Bonferroni corrections were made. The test constants and absolute p values were given for each analysis. $P<0.05$ was accepted as the statistical significance limit for all analyses.

RESULTS

The study was completed with a total of 454 participants. In terms of gender, 301 (66.3%) of the participants were women. The mean age was 38.1 ± 11.8 years [19-65] and 292 (64.3%) were married. The sociodemographic characteristics of the participants according to the study groups are given in Table 1 and the habit characteristics are given in Table 2.

Table 1. Sociodemographic characteristics according to study groups

Study Groups		Migraine group (n=150)	Non-migraine control group (n=155)	Headache-Free control group (n=149)	Total (n=454)
Age		40.4±11.8	35.6±10.9	38.6±12.2	38.1±11.8
Gender	Female	121 (%80.7)	106 (%68.4)	74 (%49.7)	301 (%66.3)
	Male	29 (%19.3)	49 (%31.6)	75 (%50.3)	153 (%33.7)
Education period (years)		11.8±4.2	13.0±4.3	12.4±4.2	12.4±4.3
Marital Status	Married	106 (%70.7)	88 (%56.8)	98 (%65.8)	292 (%64.3)
	Single	33 (%22.0)	58 (%37.4)	41 (%27.5)	132 (%29.1)
	Widow	11 (%7.3)	9 (%5.8)	10 (%6.7)	30 (%6.6)

Table 2. The habitual characteristics of the participants according to the study groups

Study Groups		Migraine group (n=150)	Other headache control group (n=155)	Headache-Free control group (n=149)	Total(n=454)
Smoking	Never Smoked	75 (%50.0)	76 (%49.0)	79 (%53.0)	230 (%50.7)
	Quit Smoking	35 (%23.3)	26 (%16.8)	23 (%15.4)	84 (%18.5)
	Smoking	40 (%26.7)	53 (%34.2)	47 (%31.5)	140 (%30.8)
Exposure to cigarette smoke		57 (%38.0)	53 (%34.2)	48 (%32.2)	158 (%34.8)
	No alcohol	95 (%63.3)	93 (%60.0)	83 (%55.7)	271 (%59.7)
	Socially	24 (%16.0)	26 (%16.8)	23 (%15.4)	73 (%16.1)
	1-3 times a month	23 (%15.3)	27 (%17.4)	28 (%18.8)	78 (%17.2)
	1-5 times a	7 (%4.7)	8 (%5.2)	11 (%7.4)	26 (%5.7)
	Almost every day	1 (%0.7)	1 (%0.6)	4 (%2.7)	6 (%1.3)
Weekly average alcohol consumption		0.4±1.1	0.5±1.4	0.9±3.8	0.6±2.4
Coffee Use		1.6±1.4	1.5±1.4	1.1±1.1	1.4±1.3

Sleep Quality: PSQI responses of all participants were evaluated. Of the total 454 participants, 121 (26.7%) had good sleep quality (PSQI ≤5) and 333 (73.3%) had poor sleep quality (PSQI> 5). The mean PSQI score was 6.5 ± 3.1 [0.0-18.0]. Table 3 shows the average scores of PSQI total and its components according to the study groups of the participants.

Table 3. PSQI component and total scores in study groups

PSQI component	Migraine group	Other headache control group	Headache-Free control group	Total
Subjective sleep quality (component 1)	1.5±0.8	1.2±0.7	1.0±0.7	1.2±0.7
Sleep latency (component 2)	1.4±0.8	1.2±0.8	0.9±0.8	1.2±0.8
Sleep time (component 3)	1.9±1.1	1.4±1.1	1.1±1.1	1.5±1.2
Conventional sleep activity (component 4)	0.1±0.4	0.0±0.3	0.0±0.2	0.0±0.3
Sleep Disorder (component 5)	1.8±0.7	1.3±0.6	1.0±0.5	1.4±0.7
Use of sleeping pills (component 6)	0.3±0.8	0.2±0.8	0.1±0.5	0.2±0.7
Daytime sleep dysfunction (component 7)	1.2±1.0	1.0±0.8	0.8±0.8	1.0±0.9
Total PSQI score	8.1±3.1	6.3±2.8	5.2±2.7	6.5±3.1

There was a statistically significant difference between the groups in terms of total PSQI scores (X^2=66,559; <0.001). In post hoc analysis, PSQI scores showed statistically difference between the migraine study group and the non-migraine headache control group (p <0.001), between the migraine study group and the headache-free control group (p <0.001) and the non-migraine control group and headache-free control group (p <0.001).

18 (12.0%) of the 150 participants in the migraine study group, 37 (23.9%) of the 155 participants in the non-migraine headache control group, and 66 (44.3%) of the 149 participants in the headache-free control group had good sleep quality. The results are given in Table 4.

Table 4. Sleep quality in study groups

	Migraine group (n=150)	Other headache control group	Headache-Free control group	Total (n=454)
Good sleep quality	18 (%12.0)	37 (%23.9)	66 (%44.3)	121 (%26.7)
Poor sleep quality (PSQI >5)	132 (%88.0)	118 (%76.1)	83 (%55.7)	333 (%73.3)
Total	150 (%100.0)	155 (%100.0)	149(%100.0)	454 (%100.0)

Participants' rates of good and poor sleep quality were statistically different among study groups (X^2=40,812, p <0,001). When the groups were compared with the binary combinations; there were statistically significant differences between the migraine group and the non-migraine headache group (X^2=7.268, p=0.007), between the migraine group and the headache-free group (X^2=38.593, p <0.001) and between the non-migraine headache group and the headache-free group (X^2=14,147, p <0,001).

The mean attack frequency in migraine group was not statistically different in patients with poor sleep quality (5.4 ± 5.1 days/month) compared

to those with good sleep quality (4.7 ± 3.7 days/month) (U=1090.0; p=0.566). The mean pain severity in the migraine group was also not statistically different between the patients with good sleep quality (6.8 ± 0.7) and those with poor sleep quality (7.2 ± 0.9) (U=890.5; p=0.064).

Daytime Excessive Sleepiness (DES): The mean Epworth score of all participants was 6.4 ± 3.7 [0.0-19.0]. Of the 454 participants, 97 (21.4%) had excessive daytime sleepiness. The distribution of the study groups in terms of Epworth scores is given in Table 5.

Table 5. Daytime Extreme Sleepiness status in study groups

	Migraine group	Other headache	Headache-Free	Total
Epworth score mean ± SS	7.2±4.2	6.1±3.6	6.0±3.2	6.4±3.7
No DES (Epworth score ≤9)	104 (%69.3)	127 (%81.9)	126 (%84.6)	357 (%78.6)
DES (Epworth score >10)	46 (%30.7)	28 (%18.1)	23 (%15.4)	97 (%21.4)

Epworth scores were significantly different between the study groups (X^2=6,822, p=0,033). According to the post hoc analysis, the differences between migraine group and control groups were statistically significant, while the difference between the control groups was not significant (p=0.025; p=0.022; p=0.997, respectively).

The rates of patients with DES were significantly different between study groups (X^2= 11.847, p=0.003). When the groups were compared with the double combinations, the rates of participants who had DES were significantly higher in the migraine group (30.7%) than in the non-migraine headache group (18.1%) (X^2=6.588; p=0.010) and headache-free group (15.4%) (X^2=9.768 p=0.002). There was no statistically significant difference between the non-migraine headache group and the headache free group (X^2= 0.376; p=0.540).

The mean frequency of attacks in migraine group was not significantly different between those with daytime sleepiness (5.7 ± 5.5 days/month) and those without daytime sleepiness (5.1 ± 4.7 days/month) (U=2124.5; p=0.269). The mean pain severity in the migraine group did not show statistically difference in patients with daytime sleepiness (7.3 ± 0.8) and those without DES (7.0 ± 0.9) (U=2091.5; p=0.187).

The Relationship between Migraine Attack Frequency and Sleep Quality and Daytime Extreme Sleepiness: PSQI and Epworth scores in migraine subgroups are given in Table 6.

Table 6. Migraine attack frequency and PSQI and Epworth relationship

Migraine groups	PSQI score	Epworth score
Mild Migraine	8.1±3.3	7.2±4.3
Moderate Migraine	7.9±3.1	7.5±4.1
Heavy Migraine	8.3±2.9	7.5±5.0
Chronic Migraine	9.0±2.8	6.5±4.1

The rates of patients with good or poor sleep quality were not significantly different in the migraine subgroups (X^2=1.097, p=0.778). No correlation was found between PSQI score and migraine attack frequency (r=0.149, p=0.069). There was no correlation between migraine subgroups and PSQI scores (r=0.024, p=0.370).

In migraine subgroups, the rates of those with or without DES were not statistically different (X^2= 0.452, p=0.929). No significant correlation was found between the frequency of migraine attacks and the Epworth score (r=0.035, p=0.674). There was no correlation between the subgroups of migraine and Epworth scores (r=-0,020, p=0,812).

Epworth Scale scores in the migraine group were significantly correlated with Pittsburgh Scale scores (r=0.259, p <0.001). The rate of daytime sleepiness (25.2%) in patients with poor sleep quality was significantly higher than those with good sleep quality (10.7%). (X^2= 11,078, p=0.001).

DISCUSSION

Neurological diseases play a major role in the loss of labor worldwide, and migraine is the third leading cause among the diseases that result in loss of labor in the last two decades (23). Migraine is a type of periodic headache with variable severity, frequency and localization. It is accompanied by anorexia, nausea, vomiting and sensitivity to light and sound (24). Its high prevalence has a significant impact on socioeconomic burden and quality of life. So that, it is important to diagnose migraine and reduce the frequency of migraine attacks.

In our study, we investigated the relationship between sleep quality and daytime sleepiness with migraine and non-migraine conditions. Insufficient sleep quality in migraine patients was higher than those with non-migraine headaches and headache-free patients. Poor sleep quality and excessive daytime sleepiness were more common in migraine patients, but no association has been found with the frequency and severity of the attacks. In this context, poor sleep quality and daytime sleepiness can be considered as comorbid conditions caused by migraine. As a result of our study, it was determined that migraine was a disease affecting sleep quality.

The mean number of migraine attacks in our study was observed to be between 2-6 attacks per month in most patients. The proportion of patients

with a high incidence of migraine attacks was higher than other studies reported in the literature (25, 26).

In our study groups, according to the PSQI score, the proportion of participants with poor sleep quality was significantly different in all groups. Recent studies have shown that sleep disorders are more common among migraine patients and that the frequency of attacks is higher in migraine patients with sleep disorders (27). More extensive studies, especially in the last 20 years, have shown that episodic migraine has become chronic in patients with sleep disorders (28). In a study conducted by Kelman and his colleagues to investigate the relationship between sleep and headache, 65% of the patients reported that headache increased with lack of sleep. In the same study, it was observed that sleep was effective in alleviate the headache (29). In our study, the group with the worst sleep quality was the migraine group, while the group with best sleep quality was the headache-free control group. In a case-control type study of melatonin hormone levels in sleep disorders of migraine patients, PSQI score was found to be 7.3 in the control group and 8.6 in the migraine group. As a result of the study, difficulty in falling asleep and poor sleep quality was more common in migraine patients than those in the control group (30). The mean PSQI total score and component scores in this study were similar to our study.

In a study of migraine and insomnia performed by Jiyoung K. and his colleagues with 2695 participants, it was found that migraine had a negative impact on sleep quality and associated with insomnia. The study was carried out in three groups including migraine patients, patients with non-migraine headache and participants without headache. Insomnia prevalence in the migraine group was found to be significantly higher than the control groups. The frequency of attacks in migraine patients with insomnia was 5.7 days/month, while the frequency of attacks in migraine patients without insomnia was determined to be 3.2 days/month and the difference between them was not statistically significant (15). In our study, similar to the study conducted by Jiyoung and his colleagues, there was no significant relationship between sleep quality and attack frequency.

Daytime excessive sleepiness is also more common among migraineurs, like poor sleep quality (31). In a study conducted with 60 female migraine patients who admitted to the neurology outpatient clinics, the mean age of the participants was lower, the mean number of monthly attacks were higher, and the daytime sleepiness ratio (32%) was similar compared to our study. As a result of the study, they argued that as the frequency of migraine attack increases, daytime sleepiness may increase due to insomnia and that migraine attacks may increase as daytime sleepiness increases and daytime sleepiness may be a symptom of migraine (32). However, in our study, in terms of daytime sleepiness status and Epworth scores, no statistically significant difference was found between migraine groups. In other words, there was no association between the frequency of migraine attacks and daytime sleepiness. Daytime sleepiness rate in patients with migraine was higher than those in the control groups. Based on these results, it can be said that migraine causes daytime sleepiness apart from other headaches. In his study, Smitherman found spontaneous recovery of headache in some migraine patients when sleep patterns were improved (33). In a pilot study, Law and his colleagues performed cognitive behavioral therapy to adolescents with migraine and insomnia and achieved successful results (34). Yang and his colleagues have improved the course of migraine with sleep behavioral therapies in their study (35).

As it is understood from these studies and our study, migraine is a disease which disturbs sleep quality and causes daytime sleepiness, in contrary to other headache types. This result supports the hypothesis of the study. The sleep quality of migraineurs is worse than patients with non-migraine headaches and headache-free participants. This may be due to the higher number of attacks in migraine patients and/or the severity of the attacks.

In the literature, there are similar studies regarding the subject, but our work is complementary in some respects. In our study, the risk of the results being affected by the participant distributions was reduced by keeping the participant numbers close between the groups. The use of validated scales have strengthened our work and reduced the subjective approach. In determining the method of our study, two separate control groups were generated, so that the relationship between migraine and sleep was examined on stronger ground, and migraine subgroups were formed to determine the degree of sleep and migraine relationship.

Limitations and Future Research: Since the data collection phase of our study was limited to 6 months, our study was conducted with a small number of participants. Since participants were selected from a specific region and surveys were used as data sources, different results could be obtained if the study was conducted in other communities or societies. This study was conducted in a tertiary hospital so results should be generalised cautiously at the population level.

CONCLUSION

The sociodemographic characteristics of the study groups were consistent with similar studies. Poor sleep quality and excessive daytime sleepiness in migraine patients were higher than those with non-migraine headache and headache-free participants. This may be due to the fact that migraine is a specific problem affecting sleep or

headache frequency and severity is greater than that of other chronic headache types. The effect of sleep quality or daytime excessive sleepiness on the frequency and severity of attacks among migraine patients were not statistically significant. This situation suggests that in sleep-migraine relationship, migraine disrupts sleep quality rather than poor sleep quality worsens migraine attacks.

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