Trigger Factors of Migraine

Migrende Tetikleyici Faktörler

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ABSTRACT

Objective: Migraine is a recurrent primary headache disorder characterized by different clinical presentations. Migraneurs report excessive sensitivity to light, sound, motion, odours, and other sensory stimuli in and between acute migraine attacks. This study was undertaken to document different trigger factors and to evaluate the differences in episodic and chronic migraine forms. Headache trigger factors were questioned in 190 patients.

Methods: Headache triggering factors were questioned in 190 patients. A set of questions concerning the trigger factors were prepared and the information about the triggering factors was collected by a structured interview. All the patients were administered Beck Depression Inventory (BDI). All analyses in this study were performed by NCSS 2007 packet programme.

Results: The trigger factors reported in this study were stressor factors, noise, sleep disturbances, fatigue, hunger, physical effort, light, sun, cold, factors affecting scalp, traveling by motor vehicle, eye strain, crowd , odours, crying, weather, high blood pressure, cigarette smoke and menstruation respectively.

Conclusion: The prophylactic treatment of migraine decreases the frequency of headaches by affecting various factors. Understanding the link between the trigger factors and headache may yield novel preventative and therapeutic approaches in the management of headache. *(Archives of Neuropsychiatry 2010; 47: 58-63)*

Key words: Migraine, headache, trigger factors

ÖZET

Amaç: Migren, farklı klinik tablolarla seyredebilen rekürran ve primer bir başağrısıdır. Migren hastaları, ışık, ses, koku ve çeşitli duyusal uyaranlara karşı aşırı hassasiyet gösterirler. Bu çalışma, epizodik ve kronik migrende farklılık gösterebilen tetikleyici faktörleri saptamak amacıyla yapılmıştır. Başağrısını tetikleyen faktörler 190 hastada sorgulanmıştır.

Yöntemler: Başağrısını tetikleyici faktörler 190 hastada sorgulandı. Tetikleyici faktörler ile ilgili sorulardan oluşan bir form hazırlandı ve veriler, yapılandırılmış görüşme metoduyla kaydedildi. Bütün hastalara Beck Depreyon Ölçeği uygulandı. Bu çalışmada bütün istatistiksel incelemeler NCSS 2007 paket programı ile yapıldı.

Bulgular: Stresör faktörler, ses, uyku düzensizliği, yorgunluk, açlık, fiziksel efor, ışık, güneş, soğuk, saçlı deriyi etkileyen faktörler, motorlu araçlarla seyahat, gözlerde yorulma, kalabalık, kokular, ağlamak, hava durumu, yüksek kan basıncı, sigara içmek ve menstruasyon sırasıyla bu çalışmada bildirilen tetikleyici faktörler arasında yer almıştır.

Sonuç: Migrende profikatik tedavi, çeşitli faktörler üzerinde etki göstererek ağrı sıklığını azaltmaktadır. Tetikleyici faktörler ile ağrı arasındaki ilişkiyi araştırarak, koruyucu tedavi seçeneklerinde yeni yaklaşımlar geliştirebiliriz. *(Nöropsikiyatri Arşivi 2010; 47: 58-63)*

Anahtar kelimeler: Migren, başağrısı, tetikleyici faktörler

Introduction

Migraine is a recurrent primary headache disorder characterized by different clinical presentations. The pathophysiology of migraine is still unclear. Triggers of an attack may initiate a depolarizing neuroelectric and metabolic event like the spreading depression, thus, the factors altering neuronal hyperexcitability should be determined (1).

Migraneurs report excessive sensitivity to light, sound, motion, odors, and other sensory stimuli in and between acute migraine attacks. The immediate antecedents of headaches are the stimuli that precipitate or aggravate headaches, i.e., the trigger factors. Underlying trigger factors of migraine differ between individuals and even between attacks in any given patient. The recognition of the precipitating factors of migraine is very important, because avoidance from these factors may lessen the frequency and the severity of the attacks (2).

Stress, anxiety, glare and noise are the most commonly reported trigger factors (3). Menstruation, environmental factors, sleep disturbances, fatigue, alcohol and nutrition are also frequently mentioned. Beside these well known factors, there are also some other triggers. Noise, sleep disturbances, weather, crying and sucralose are some of the other precipitating factors recently reported (2-8).

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This study was undertaken to document different trigger factors and to evaluate differences in episodic and chronic migraine forms, to show the differences among male and female patients, to detect the correlations between triggers, precipitating factors and the other factors, and to display the impact of depression on trigger and precipitating factors.

Methods

One hundred and ninety (190) patients with migraine admitted to the headache outpatient unit for their routine controls, were consecutively recruited. Headache characteristics featuring onset, frequency, duration and type of pain were noted. Demographic characteristics of all subjects were recorded. All subjects were interviewed by the same doctor at the headache outpatient unit. Physical and neurological examinations were performed. Medical history included current and previous diseases, medications (particularly, analgesics, antidepressant and oral contraceptive drugs). Family history of migraine and other diseases, and consumption of alcohol, caffeine and smoking habits were asked.

Headache trigger factors were questioned in 190 patients. A set of questions concerning the trigger factors were prepared and the information about the trigger factors was collected with a structured interview. All patients were administered the Beck Depression Inventory (BDI). The BDI was completed by the subjects. The BDI is a 21-item scale assessing the symptoms and experience of depression, and is scored by summing the responses. Each of the 21 items in this scale includes four different aspects to examine the patient's mood in the preceding week. This test was developed by Beck and associates in 1961 and used in large samples (9,10). The 1979 version of the BDI was adapted to Turkish by Hisli in 1988 (11).

All analyses in this study were performed with NCSS 2007 package programme. Besides descriptive statistical methods (mean+standard deviation (SD)+frequency distribution), independent t-test was used in comparisons of dual groups. The Chi-square test was used to compare the qualitative data. The significance level was accepted to be 0.05 was in all comparisons.

Results

Age of subjects ranged between 20 and 56 years. There were 156 female and 34 male patients. The distribution of the precipitating and improving factors of migraine headaches are shown in Figure 1. The trigger factors reported in this study were: stressor factors (58.7%), noise (19,8%), sleep disturbances (16.1%), fatigue (15.6%), hunger (10.9%), physical effort (8.9%), light (6.8%), sun (5.8%), cold compress (5.2%), factors affecting scalp (%4.1), travelling by motor vehicle (3.1%), eye strain (3.1%), crowd (2.1%), odor (2.1%), crying (2.1%), weather (1%), high blood pressure (0.5%), cigarette smoke (0.5%) and menstruation (0.5%), respectively (Figure 1).

The stressor factors, sleep disturbances, fatigue were investigated for the presence of any statistically significant relationships between gender, migraine type, antidepressant drug use, onset of pain, pain duration, pain severity or Beck score and these 3 trigger factors. Stressor factors were found to be statistically significant in female patients (p=0,003) (Table 1b). There was no statistically significant relationship between stressor factors and antidepressant drug consumption (Table 1a).

Sleep disturbances and fatigue had no statistically significant relationship with gender, migraine type, antidepressant drug use, onset of pain, pain duration, severity or BDI scores (Table 2a, b, 3a, b). There was no statistically significant association between stressor factors and onset, pain duration, pain severity and BDI scores (Table 3a, 4a).

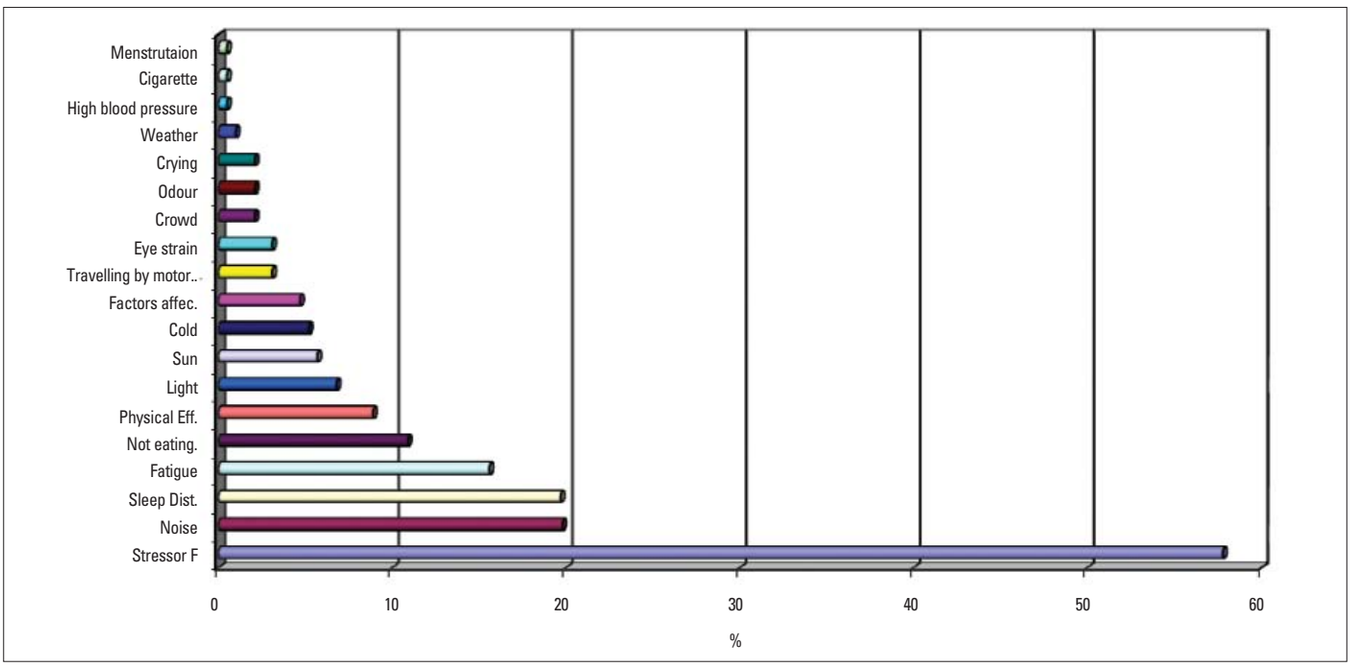

Figure 1. Distribution of the triggering factors

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There was no statistically significant relationship between positive family history of migraine and onset of disease, pain severity and duration, and positive family history showed no difference in episodic or chronic migraine group (Table 4a,b)

There were also no statistically significant association of onset of the disease with severity of pain and duration of attacks (p:0.203).

Discussion

Studying the trigger factors of migraine is an attempt to reduce the frequency of acute migraine attacks. Despite advances in migraine treatment, the success rate in treatment options is still limited.

In this study, stressor factors, noise, sleep disturbances and fatigue were found to be the most common trigger factors of migraine.

Psychological stress is generally reported to be a major contributor to primary headaches (2,12-16). Trigger factors and personality traits in migraine patients suggest that activation of neurovascular systems is secondary to more complex events taking place in the central nervous system (17). Stress can be a predisposing factor that contributes to headache disorder onset, can accelerate the progression of the headache

Table 1a. Comparison of stressor factors

		Stressor factors (-)		Stressor factors (+)		
Gender	Male	22	27.2%	12	10.8%	χ^2:8.59
	Female	57	72.8%	99	82.9%	P=0.003
Migraine type	Chronic migraine	46	56.8%	55	49.5%	χ^2:0.98
	Episodic migraine	35	43.2%	56	50.5%	P=0.321
Antidepressant drug consumption	No	51	64.6%	57	51.8%	χ^2:3.04
	Yes	28	35.4%	53	48.2%	P=0.081

Table 1b. Comparison of stressor factors

	Stressor factors	N	Ort±SS	T	P
Onset (year)	No	81	10.26±9.08	-0.709	0.479
	Yes	111	11.23±9.65		
Pain severity	No	81	4.17±1.99	-0.173	0.863
	Yes	110	4.23±2.25		
Duration (hour)	No	81	19.54±22.13	-0.316	0.752
	Yes	110	20.64±24.85		

Table 2a. Comparison of sleep disturbances

		Sleep (-)		Sleep (+)		
Gender	Male	27	17.1%	7	20.6%	χ^2:0.23
	Female	131	82.9%	27	79.4%	P=0.626
Migraine type	Chronic migraine	86	54.4%	15	44.1%	χ^2:1.19
	Episodic migraine	72	45.6%	19	55.9%	P=0.275
Antidepressant drug use	No	91	58.3%	17	51.5%	χ^2:0.52
	Yes	65	41.7%	16	48.5%	p=0.472

Table 2b. Comparison of sleep disturbances

	Sleep	N	Ort±SS	T	P
Onset (year)	No	158	10.87±9.46	0.140	0.889
	Yes	34	10.62±9.23		
Pain severity	No	158	4.16±2.08	-0.559	0.577
	Yes	33	4.39±2.44		
Duration (hour)	No	157	17.48±12.37	1.85	0.065
	Yes	34	13.21±11.16		
BECK	No	158	15.15±8.9	0.5902	0.368
	Yes	34	13.65±8.45		

disorder into a chronic condition, and can precipitate and exacerbate individual headache episodes. Stress is assumed to affect primary headache by directly impacting pain production and modulation processes at both the peripheral and central levels. Stress can also independently worsen headache-related disability and quality of life (18). Migraine headaches are often precipitated by stress and seem to involve neurogenic inflammation of the dura mater associated with the sensation of throbbing pain (19). Trigeminal nerve stimulation had been reported to activate rat dura mast cells and increase vascular permeability, effects inhibited by neonatal pretreatment with capsaicin implicating sensory neuropeptides, such as substance P (19).

Stressor factors were reported as the most common trigger factors by many authors. (2,12-15). In this study, stressor factors were statistically significant in female patients. This study can be criticized as the male and female patients are not equally distributed, but still we believe that it should be considered as important. The Beck scores did not show a significant relationship between the stressor factors, therefore, we thought that, stress is triggering migraine headaches, independent of depressive behaviour. The migraneurs, especially the female ones should try to avoid facing chronic and daily stressor factors.

Migraneurs often describe environmental triggers of their headaches. In this study, noise, exposure to daily light and sun,

Table 3a. Comparison of fatigue

		Fatigue (-)		Fatigue (+)		
Gender	Male	134	82.7%	24	80.0%	χ^2:0.128
	Female	28	17.3%	6	20.0%	P=0.720
Migraine type	Chronic migraine	89	54.9%	12	40.0%	χ^2:2.26
	Episodic migraine	73	45.1%	18	60.0%	P=0.132
Antidepressant drugs	No	94	59.1%	14	46.7%	χ^2:1.59
	Yes	65	40.9%	16	53.3%	P=0.206

Table 3b. Comparison of fatigue

	Fatigue	N	Ort±SS	T	P
Onset (year)	No	162	10.89±9.29	0.35	0.721
	Yes	30	10.47±10.12		
Pain severity	No	162	4.2±2.14	-0.86	0.122
	Yes	29	4.21±2.14		
Duration (hour)	No	162	18.29±18.22	0.82	0.183
	Yes	29	30.71±41.97		
BECK	No	162	15.02±8.95	1.93	0.05
	Yes	30	14,17±8,2		

Table 4a. Comparison of family history

		N	Mean	T	P
Onset (year)	Family history (-)	162	9.45±9.33	-1.1	0.270
	Family history (+)	30	11.31±9.46		
Pain severity	Family history (-)	162	4.3±2.21	0.29	0.772
	Family history (+)	29	4.19±2.13		
Duration (hour)	Family history (-)	162	24.21±26.52	0.546	0.239
	Family history (+)	29	19.2±23.04		

Table 4b. Comparison of family history

	Family history (-)	Family history (+)		
Chronic migraine	24 (%60.0)	75 (%50.3)	χ^2:1.18	
Episodic migraine	16 (%40.0)	74 (%49.7)	P=0.277	
	N	**Onset (year)**	**T**	**P**
Chronic migraine	101	10.03±9.34	-1.21	0.225
Episodic migraine	91	11.69±9.43		

travelling, weather, crowd and cigarette smoke have been reported as environmental triggers and noise was detected as the second most common trigger factor (5).

Martin et al. showed that the individuals who suffered from regular headaches had lower tolerance for noise stimulus than the individuals who did not suffer from headaches. The LARES study analyzed noise annoyance in the housing environment and correlated it to medically diagnosed illness, including migraine. Increased risk of migraine was confirmed in adults with severe and chronic annoyance from traffic and neighborhood noise (20).

There has been relatively little research on the visual stimuli that can trigger migraine episodes reporting visual stimuli as a common trigger of migraine and displaying its association with pattern glare (21). In our study, visual stimuli such as exposure to sun and light have been reported. Harle et al. suggested that pattern glare might be useful as a screening tool for this purpose. 6.3% of our patients reported noise as a trigger factor. Migraine sufferers may be more sensitive to light in general, and those with chronic headache may be more sensitive to environmental lighting, even when they are headache-free (22).

Our patients have reported travelling in motor vehicles as a trigger factor. Recent literature suggests important relationships between the trigeminal system and vestibular nuclei that may have implications for both motion sickness and migraine (23,24), which can explain why travelling can trigger migraine. Also, air pollution and various other environmental factors may contribute to travelling (25).

Many studies have investigated the link between migraine and the weather (2,12). Self-reported surveys indicate that weather can trigger migraine headaches. Villeneuve et al. have studied the relationship between weather and emergency room visits for migraine headaches, and their findings provided little support for this hypothesis (26). Prince et al. have shown that the migraneurs were susceptible to multiple weather variables (27). In this study, weather was reported as a trigger in 1% of the patients.

Cigarette smoke is one of the other environmental trigger factors. Iribarren et al. have reported a statistically significant increase in severe headaches correlating with total tobacco smoke exposure time (28,29). Although cigarette smoke is a reported trigger for many migraineurs, in this study it was in the ratio of 0,5%.

As migraine has a substantial economic impact, remediation of correctable environmental triggers may benefit employee attendance and productivity among migraineurs.

Sleep has long been recognized to both provoke and relieve headache. Epidemiologic research has associated sleep disorders with more frequent and severe headaches. Seidel et al. reported decreased quality of sleep in migraineurs and suggested that it is a consequence of migraine itself, and cannot be explained exclusively by comorbidity with depression or anxiety (4). Chronic daily awakening and morning headache patterns are particularly suggestive of sleep disorders. The hypothalamus forms a part of the central autonomic network, regulating body homeostasis and controlling pain. The hypothalamus and interconnected brainstem areas are likely to represent the neural sites responsible for the chronobiological features of some headaches (30). Sleep disorders were the third most common trigger factor in this study. Kelman et al. have studied the sleep/migraine relationship, and implicated sleep disturbance in specific headache patterns and severity (2). In that study, the short-sleep group, who routinely slept 6 hours per night, exhibited the more severe headache patterns and more sleep-related headache, and the sleep complaints occurred with greater frequency among chronic than episodic migraineurs. In our study, there was not a statistically significant difference between episodic and chronic migraine group regarding sleep disturbances.

Fatigue was the next common trigger in our study. Fatigue was mentioned as a trigger factor in only one other study, Giffin et al. found feeling tired and weary as the most common premonitory symptoms in their study (31). In this study, there was a statistically significant relationship between fatigue and the Beck scores, which indicated that depression was positively related with fatigue, therefore, the patients whose migraine headaches were triggered by fatigue should be carefully monitored for depression and should be consulted with a psychiatrist in sight of this probable comorbidity.

In this study, the differences among episodic and chronic migraine have been explored. It was stated that episodic migraine patients had less stress, not eating on time, odor, neck pain, smoke, sleeping late and exercise than patients with chronic migraine (2). We have investigated the relations between positive stressor factors with age, gender, migraine type, antidepressant drug use, and with BDI scores. There was no statistically significant association between these factors. Depressive behaviour and antidepressant drug use did not increase predisposition to stressor factors.

We have listed other factors like crying and the factors affecting scalp. The act of crying seems to be an important precipitating factor for primary headaches. Although the physiology of crying is not well understood, Fragoso and Evans et al. considered crying to be a potential factor for triggering headache attacks (32,7). Factors affecting scalp has not been reported as a precipitating factor of migraine in the literature. Seven patients in this study had migraine headaches induced by the scalp factors.

All these factors may differ in each individual, in each attack and one can experience different trigger factors in different attacks. The patients usually define multiple trigger factors. We know that the prophylactic treatment of migraine (e.g. beta blockers, calcium channel blockers) decreases the frequency of headaches by affecting various factors (33). Thus, we assume that these factors can originate from a single center in brain, like the hypothalamus.

Understanding the link between the trigger factors and headache may yield novel preventative and therapeutic approaches in the management of headache, hence the follow-up of a migraine patient should definitely include detection of the trigger factors and awareness of the patients on these factors should be provided.

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