Journal of Neurological Sciences [Turkish] **27:(4)**# 25; 386-394, 2010
http://www.jns.dergisi.org/text.php3?id=386
Research Article

Intergender Differences in Triggering Factors Among Different Subtypes of Migraine and Tension-Type Headache

Babür DORA[1], Nurgül YILMAZ[1], Ebru APAYDIN-DOĞAN[1], Candan ÖZDEMİR-KARAHASAN[1], Mehtap TÜRKAY[2]

[1]Akdeniz University, Neurology, Antalya, Türkiye [2]Akdeniz University, Public Medicine, Antalya, Türkiye

Summary

Background: There are only few studies adressing differences of triggering factors between genders and different types of migraine. This study was conducted to assess the differences between triggering factors and their intergender differences in migraine with aura(MA), migraine without aura(MO) and tension-type headache(TTH)
Methods: A total of 221 patients (53 MA, 129 MO and 39 TTH) were given a questionnaire consisting of headache triggers.
Results: Logistic regression analysis revealed that female sex, bright light and skipping meals were associated with migraine and milk was associated with TTH. Comparison according to gender showed that in MO the total sum of triggers was higher and bright light, loud noise, strong odors, coffeinated beverages, insufficient sleep, high altitude and having any food trigger were more frequent in females. In MA no gender difference was found. In patients with TTH alcoholic beverages other than red wine were a more common trigger among male patients
Conclusion: Our results show that triggers differ among females and males with MO but not MA. This may suggest that the female brain is more vulnerable to triggers in MO. It is possible that the regions of the brain on which triggers act show gender specific differences possibly related to differences in neurotransmitter concentrations, receptors, excitability and hormonal interactions.

Key words: Migraine with aura, Migraine without aura, tension-type headache, headache triggers, gender

Migren Tipleri Arasında ve Gerilim-Tipi Başağrısında Tetikleyici Faktörlerde Cinsiyete Göre Farklılıklar

Özet

Giriş: Migren hastalarında tetikleyici faktörlerin migren subtipleri ve cinsiyetler arasındaki farklılıklarına değinen çalışma sayısı azdır. Bu çalışmada tetikleyici faktörlerin migren subtipleri ve gerilim-tipi başağrısı (GTBA) arasındaki ve cinsiyetler arasındaki farklılıklarına bakmayı amaçladık.
Metod: Toplam 221 hastaya [53 auralı migren (MA), 129 aurasız migren (MO) ve 39 GTBA] çeşitli tetikleyicilerin yazılı olduğu bir anket formu verilerek doldurmaları istendi.
Bulgular: Lojistik regresyon analizi sonucunda kadın cinsiyet, parlak ışık ve öğün atlamak migren ile ve süt ürünleri GTBA ile ilişkili bulundu. Aurasız migren hastalarında kadınlarda toplam tetikleyici sayısı erkeklere gore daha fazlaydı ve parlak ışık, yüksek ses, keskin kokular, kafeinli içecekler, yetersiz uyku, yüksek rakım ve herhangi bir besin tetikleyicisine sahip olma daha sık görüldü. Auralı migrende cinsiyetler arasında tetikleyicilerde farklılık

saptanmadı. Erkek GTBA hastalarında alkollü içecekler kadınlara gore ağrıyı daha sık tetikliyordu.
Sonuç: Sonuçlarımız migrende tetikleyici faktörlerin aurasız migrende cinsiyetler arasında farklılık gösterirken auralı migrende bunun görülmediğini göstermektedir. Bu kadın aurasız migren hastalarında beynin tetikleyicilere karşı daha hassas olabileceğini akla getirmektedir. Migren tetikleyicilerinin etkilediği beyin bölgelerinin cinsiyetler arasında nörotransmitter konsantrasyonu, reseptör eksitabilitesi veya hormonal etkileşimleri gibi nedenlere bağlı olarak farklılık gösteriyor olması olasıdır.

Anahtar Kelimeler: Aurasız migren, auralı migren, gerilim-tipi başağrısı, tetikleyici faktörler, cinsiyet

INTRODUCTION

Although it is a matter of debate whether migraine triggers are initiators of migraine attacks or some are a part of the prodromal symptoms the questioning of migraine triggers and their avoidance still plays an important role in the management of migraine[3,10,25]. Although there are some studies adressing the frequency of migraine triggers in patients with migraine and tension-type headache[6,9,15,23,26,28] only few have looked at differences between different types of migraine and whether intergender differences between these triggers exist[15,16,21,22].

Migraine triggers can be roughly cathegorised into two groups such as food triggers and non-food triggers. Although food triggers like red wine or chocolate are quite popular, their actual frequency among migraine patients may not be as high. Well known food triggers other than chocolate and red wine are cheese, cofee-tea, cold beverages, citrus fruit, other alcoholic drinks, aspartame and other food containing tyramine, histamine or beta-phenylethylamine[1,3,13,20,23,24]. Non-food triggers include changes in female hormone levels (menses, oral contraceptives), skipping meals, changes in sleep pattern (insufficient sleep or excess sleep), strong odors, bright light, loud noises, weather changes, stress, physical exertion and other environmental factors[2,3,8,9,12,17,23].

Although in general practice migraine triggers are well documentated by patients it is also well known that not all triggers apply to all migraine patients and in the same patient to all attacks. The differences in responses to triggers might result from genetic differences, differences in lifestyle or environmental factors.

It is still not clear whether migraine with aura (MA) and migraine without aura (MO) are two different entities sharing a common pathophysiology or whether aura and headache are independent phenomenon[7,14,22]. Some patients with MA also have attacks of MO[18,22]. It is also still debated whether migraine and tension-type headache (TTH) are disorders on opposite ends of the same spectrum and may share a common pathophysiology[5,11,19]. It would therefore be interesting to know whether triggering factors for migraine are different among these two types of migraine and which triggers could differentiate migraine and TTH and whether intergender differences between triggering factors exist.

MATERIAL AND METHODS

A total of 221 patients, 129 patients with migraine without aura (MO), 53 patients with migraine with aura (MA) and 39 patients with tension-type headache (TTH) according to the ICHD-2 criteria attending the headache outpatient clinic at the Akdeniz University hospital were included into the study. All patients were seen by a headache specialist. Patients with MO were allowed to have infrequent attacks (less than 1/month) of TTH while patients with TTH did not have any other headache disorder. Patients with MA were only

included if over 90% of the migraine attacks were MA as assessed by a headache diary. Again infrequent attacks (less than 1/month) of TTH were allowed. Most patients were receiving prophylactic treatment at the time they were entered into the study. All patients orally informed consented.

Demographic data and data concerning headache (age at onset, duration of disease, frequency, aura) were recorded. All patients were given a questionnaire consisting of 37 headache triggers which they were supposed to answer with "Yes, does trigger my headache" or "No, does not trigger my headache". A blank space was left at the end of the questionnaire and every patient was asked to fill in there additional triggers which are not on the list which they thought it triggers their headache. All patients were instructed not to check those items which aggravated their headache during an attack but only items that they thought it starts the headache. They were also told that these items did not have to trigger an attack every time to avoid misunderstandings.

Data were analyzed on a database prepared on Statistical Package for the Social Sciences, version 13.0 (SPSS Inc, Chicago, IL, USA). Descriptive statistics is presented in the tables. Chi-square tests were used to determine the differences between expected and observed frequencies in independent groups. We used t test and / or One – way ANOVA (analysis of variance) to compare the measurement values for differences among two or more independent groups. All triggers were analyzed by univariant analyses at first and then the variables found significant were analyzed by Logistic regression. A result was considered significant if the P-value was <0.05.

RESULTS

The mean age was 36,84±10,68 years in the MO group, 39,00±10,14 years in the MA group and 41,21±13,05 years in the TTH group. There was no significant difference in age between the groups. The frequency of women was 89,1% in the MO group, 90,6% in the MA group and 64,1% in the TTH group. The difference was significant for TTH (p<0,001), but there was no difference between the migraine groups.

The main 10 triggers of the 3 groups are given in Table-1. Mean of the number of triggers was 13,78±5,71 in the MO group, 14,43±5,17 in the MA group and 11,87±5,14 in the TTH group. The difference was nonsignificant.Triggers which were not on our questionnaire but were reported by some patients were red meat in 5 (MO (2); MA (2), TTH (1)), wet hair in 5 (MO (4), TTH (1)), computer screens in 4 (MO(3), TTH (1)), crowded places in 3 (MO (1), MA (2)), eggs in 2 (MO), wheat in 2 (MO), gasoline in 2 (MO), strawberries in 1 (MO), melons in 1 (MO), pickles in 1 (MO), lime tea in 1 (MA).

When migraine patients combined (MO and MA) were compared to patients with TTH bright light (p<0,000), skipping meals (p<0,000), excess sleep (p<0,05) and fermented foods (p<0,05) were more common triggers in patients with migraine. Chocolate, raw onions, red wine, aspartame and menses were close to significance and showed a linear by linear association and were therefore included in the logistic regression analysis. Milk was a more common trigger in TTH (p<0,05). Logistic regression analysis revealed that female sex (p<0,01; 95% CI:0,112-0,688), bright light (p<0,01; 95% CI:0,145-0,733) and skipping meals (p=0,012; 95% CI:0,126-0,779) were associated with migraine and fermented foods had only a near significant association (p<0,052; 95 CI%:0,056-1,011). Milk was found to be associated with TTH (p<0,01; 95% CI:1,432-12,305). (Table-2)

Table 1: Most frequent 10 triggers in the headache groups

Migraine without aura (n=129)		**Migraine with aura (n=53)**		**Migraine combined (n=182)**		**Tension-type headache (n=39)**	
Stress	93,8%	Stress	96,2%	Stress	94,5%	Stress	92,3%
Skipping meals	89,1%	Loud noise	92,5%	Skipping meals	89,0%	Fatigue	82,1%
Fatigue	86,8%	Skipping meals	88,7%	Loud noise	87,9%	İnsufficient sleep	82,1%
İnsufficient sleep	86,8%	İnsufficient sleep	88,7%	İnsufficient sleep	87,4%	Loud noise	79,5%
Loud noise	86,0%	Bright light	86,8%	Fatigue	86,3%	Food triggers	74,4%
Menses	80,0%	Fatigue	84,9%	Bright light	79,1%	Skipping meals	64,1%
Food triggers	79,8%	Strong odors	79,2%	Food triggers	79,1%	Strong odors	61,5%
Bright light	76,0%	Food triggers	77,4%	Menses	77,3%	Weather	61,5%
Strong odors	65,1%	Weather	71,7%	Strong odors	69,2%	Menses	60,0%
Excess sleep	65,1%	Menses	70,8%	Weather	65,4%	Excess sleep	46,2%

Comparison of patients with MO and MA showed that bananas ($p<0,05$) were a more frequent trigger in MO while raw onions ($p<0,05$) and horsebeans ($p<0,05$) were a more common trigger in MA.

When migraine triggers were compared according tho gender in the individual groups, in patients with MO bright light ($p<0,000$), loud noise ($p=0,001$), strong odors ($p=0,02$), coffeinated beverages ($p=0,01$), insufficient sleep ($p<0,01$), high altitude ($p<0,05$) and having any food trigger ($p<0,05$) were more frequent in female patients compared to males. The total sum of triggers was also higher in female MO patients (14,40±5,53 (Female) vs 8,71±4,66 (Male);$p<0,000$). (Table-3)

In patients with MA there was no gender difference among triggering factors. In patients with TTH alcoholic beverages other than red wine were a more common trigger among male patients ($p<0,05$). (Table-3)

Table 2: Logistic regression analysis of differential trigger factors in Migraine (Migraine with and without aura) vs Tension-type headache

	B	Significance	Exp (B)	95.0% CI for exp(B)	
				Lower	Upper
Gender (Female)	-1,283	0,006	0,277	0,112	0,688
Bright light	-1,121	0,007	0,326	0,145	0,733
Skipping meals	-1,161	0,012	0,313	0,126	0,779
Fermented foods	-1,432	0,052	0,239	0,056	1,011
Milk	1,434	0,009	4,197	1,432	12,305
Constant	2,529	0,001	12,543		

-2 log likelihood: 162,856; Cox&Snell R square:0,177; Nagelkerke R square: 0,292

Table 3: Trigger factors according to gender in the headache groups

Triggers	**Migraine without aura (n=129)**		**Migraine with aura (n=53)**		**Tension-type headache (n=39)**	
	Female (n=115)	**Male (n=14)**	**Female (n=48)**	**Male (n=5)**	**Female (n=25)**	**Male (n=14)**
Total amount of triggers	14,40±5,53*	8,71±4,66	14,65±5,35	12,40±2,30	11,92±5,35	11,79±4,93
Individual triggers	**%**	**%**	**%**	**%**	**%**	**%**
Bright light	81,7 *	28,6	85,4	100,0	44,0	42,9
Loud noise	90,4 £	50,0	91,7	100,0	84,0	71,4
Strong odors	68,7 †	35,7	79,2	80,0	72,0	42,9
Skipping meals	90,4	78,6	87,5	100,0	60,0	71,4
Stress	94,8	85,7	95,8	100,0	96,0	85,7
Fatigue	88,7	71,4	87,5	60,0	80,0	85,7
Insufficient sleep	90,4 †	57,1	89,6	80,0	80,0	85,7
Excess sleep	67,8	42,9	56,3	100,0	40,0	57,1
Weather changes	62,6	64,3	70,8	80,0	56,0	71,4
High altitude	37,4 ‡	7,1	45,8	0	28,0	57,1
Cigarette smoke	34,8	21,4	39,6	40,0	16,0	28,6
Physical strain	29,6	7,1	29,2	40,0	36,0	35,7
Blows to the head	46,1	35,7	45,8	40,0	60,0	57,1
Food triggers (any)	82,6 ‡	57,1	75,0	100,0	68,0	85,7
Fatty food	37,4	21,4	37,5	40,0	28,0	35,7
Raw onions	33,0	14,3	50,0	40,0	32,0	7,1
Milk	9,6	14,3	10,4	20,0	32,0	14,3
Cheese	7,0	7,1	14,6	20,0	8,0	7,1
Red wine	22,6	14,3	12,5	20,0	4,0	14,3
Alcohol (other than red wine)	23,5	28,6	16,7	40,0	4,0	35,7 @
Fermented foods	22,6	14,3	20,8	20,0	8,0	7,1
Caffeine containing beverages	33,0 †	0	33,3	0	28,0	14,3
Chocolate	20,9	14,3	35,4	0	8,0	14,3
Processed or cured meat products (salami, sausages etc)	15,7	14,3	12,5	20,0	4,0	7,1
Aspartame	5,2	0	0	0	8,0	14,3
Tropical fruit	4,3	7,1	12,5	0	4,0	0
Tomatoes	7,0	0	6,3	0	4,0	7,1
Bananas	7,8	7,1	0	0	8,0	7,1
Horsebeans	5,2	7,1	14,6	20,0	16,0	7,1
Nuts	16,5	14,3	22,9	0	16,0	28,6
Vanilla	7,0	7,1	8,3	0	8,0	7,1
Cold foodstuff	26,1	7,1	20,8	0	32,0	28,6

* p<0,000 (Females with MO compared to males with MO)
† p<0,01 (Females with MO compared to males with MO)
‡ p<0,05 (Females with MO compared to males with MO)
£ p=0,001 (Females with MO compared to males with MO)
@ p<0,05 (Males with TTH compared to females with TTH)

DISCUSSION

This is a study reporting the triggering factors of headache in male and female MO, MA and TTH patients seen in a headache subspeciality clinic.

The main 10 triggers reported in the 3 headache groups were almost similar (Table-1). Stress was the most frequent trigger in all headache groups and loud noise, strong odors, fatigue, insufficient sleep, weather changes, menses and having any food trigger were reported with similar frequencies. Stress has also been reported as the most frequent trigger of both migraine and TTH in other studies ranging from 38-84% and 19-82% respectively[6,16,21,22,23,26,27]. Some studies compared stress as a trigger in migraine and TTH and have found either no difference[23,26,28] or that it was more common in migraine[6].

Combined comparison of both migraine groups to the TTH group showed that bright light, skipping meals, excess sleep and fermented foods were significantly more common triggers in migraine while milk was reported more often in TTH. Logistic regression analysis revealed that female gender ($p<0,01$), bright light ($p<0,01$) and skipping meals ($p=0,012$) were the main triggers differentiating migraine and TTH (Table-2). Bright light has also been found more common in migraine in the study of Spierings et al[26] while it was not different 2 other studies[6,23]. Most studies of precipitating factors in migraine have reported much lower frequencies of bright light as a migraine trigger (ranging from 2,7-50%) compared to our study (79,1%)[6,16,21,22,23,26,27]. In fact figures as low as 2,7% do not seem reasonable to us because in our personal experience we encounter sensitivity to bright light very often in migraineurs in our daily practice and in that study an open questionnaire was used and questions about triggers were more general[27]. We found that in 89% of our migraine patients compared to 64,1% of TTH patients headaches were triggered by hunger. Although these figures are similar to studies reporting skipping meals as a trigger for migraine in frequencies ranging from 40-82%[16,21,23,26], studies comparing migraine and TTH have found no difference[23,26]. We have found no difference among other triggers which have been reported to differ between migraine and TTH in other studies, such as fatigue, food triggers, menses, weather changes, strong odors and smoke[6,26,28]. In the study of Scharff et al there was also no difference among any triggers between migraine and TTH[23].

Comparison of triggering factors between MO and MA only revealed that some food triggers differed between the groups. Bananas were more frequent a trigger in MO (7,8% in MO vs none in MA) and raw onions and horsebeans were more common in MA (31,0% in MO vs 49,1% in MA and 5,4% in MO vs %15,1 in MA respectively). These findings have not been reproduced in other studies. Kelman et al reported that in patients with MA stress, skipping meals, weather changes, changes in sleep pattern, excess sleep, strong odors, bright light, alcohol, heat, physical exersize and food triggers were more common[16]. Russell et al found that only bright light differred as a trigger between MA and MO, being more frequent in MA[22]. These studies have included much larger numbers of patients compared to our study and in contrast we have found higher frequencies of the above mentioned triggers in both migraine groups which could explain why our results showed no significant differences in between MA and MO. The differentiating factors between MA and MO we found are all specific food triggers which have not been adressed seperately in both studies. Cultural gastronomical differences like ingestion of horsebeans and raw onions could also account for our findings.

Although there was a striking difference in triggering factors in female patients with MO compared to males, none was found in patients with MA (Table-3). The mean number of triggers was significantly higher and sensual triggers (odor, light, noise), insufficient sleep, high altitude, having any food trigger and coffeinated beverages were much more common triggers in females with MO. Studies comparing triggers in patients with migraine according to gender have reported different results. Van den Bergh et al also reported that triggers were more common only in female migraineurs in whom the migraine was menstrual cycle-related[27]. We did not differ between menstrual migraine and non-menstrual cycle related migraine. Comparable to our results Robbins et al reported that triggering by strong odors was more comon in women in addition to weather changes, smoke and skipping meals which were not different in our study[21]. But this was a retropective study not differing between MO and MA. In the study done by Kelman et al weather changes, strong odors and heat were found to be more common triggers among female migraineurs but gender differences were not analysed according to the type of migraine[16]. Heat was only a negligible trigger in our study being reported in only 2,3% of patients with MO and in none of the other groups. Russell et al compared gender differences in patients with MO and MA but found no difference in triggering factors between male and female patients with MO[22]. In patients with MA stress was more common a trigger among women (51% vs 30,6%). Because stress was a extremely common trigger in all patient groups and both genders, no difference was found in our study. In TTH the only differing trigger between both genders we found was alcoholic drinks other than red wine.

Our results also show that triggering factors differ among female and male patients with MO but not MA. There however are only minor triggers which are different in MO and MA in general. This may suggest that the female brain is more vulnerable to triggers in MO. Hormonal factors could be an explanation for this difference but would not explain why we found no difference in MA. Results of studies with larger numbers of patients with MA may suggest that some gender differences may also be present in MA[22]. It is also possible that the regions of the brain on which triggers act show gender specific differences possibly related to differences in neurotransmitter concentrations, receptors, excitability and hormonal interactions.

As can be seen above, studies dealing with precipitating factors in migraine have revealed wide differences in frequencies of individual triggers. Also the figures we have found are much higher than those reported in other studies. This could be a result of methodological differences like the type of questionnaire used (open or closed), the way it is applied (i.e. by phone or face to face), the differences in asking specific triggers (like horsebeans or fermented foods in our study), different definitions of triggers (for example bright light has been defined as only sunlight or any bright light including fluorecents or differences in patient populations (education level, lifestyles, culture). It is also possible that multiple triggers may interact, facilitating one, or each other which makes the assessment of the impact of an individual trigger extremely difficult. This interaction cannot be ruled out by simple questionnaires.

Other possible reasons for our high frequencies of triggers may be that our patient population consisted mainly of higher educated patients which are more aware of there disease and their precipitants and are more eager to report them. Cultural differences may also play an important role in determining triggers. Socioeconomic challenges result in a higher level of stress and insomnia. In the turkish culture alcohol, especially red wine

is not consumed very widely compared to western cultures and foods like horsebeans, raw onions and fatty food are consumed more often which could result in an under- or overrepresentation of the trigger respectively.

Burstein and Jakubowski hypothesised that these wide variety of triggering factors may suggest that migraine attacks are triggered in different regions of the brain not directly involved in nociception which in return activate the trigeminovascular system[4]. These may include the piriform cortex that becomes active by odors, the lateral hypothalamus and perifornical area which becomes active during hunger and insufficient sleep, the bed nucleus of stria terminalis which is activated during and long after the termination of stress. They further hypothesized that the projections of these brain areas converge on the superior salivatory nucleus (SSN) which in turn stimulates the release of neuropeptides which start a cascade of events resulting in the activation of meningeal nociceptors[4].

We have shown that bright light and skipping meals are the main triggering factors different between migraine and TTH. But the fact that these two triggers were also very common in TTH shows that response to triggers cannot be used in differentiating migraine and TTH but merely may be a sign that some regions of the brain in migraine might be more susceptible to these triggers. Our results also show that triggering factors differ among female and male patients with MO but not MA. Studies suggesting that MO and MA are different entities also raise the possibility that some areas of the brain may react different to triggers in these two types of migraine[7,14]. Our results suggest a gender related difference in reaction to triggers in MO but these results have to be confirmed in other studies and studies investigating the reasons for this difference are needed.

Acknowledgement: This study was conducted at the Akdeniz University Hospital

Correspondence to:
Babür Dora
E-mail: bdora@akdeniz.edu.tr

Received by: 02 September 2010
Revised by: 16 November 2010
Accepted: 30 November 2010

The Online Journal of Neurological Sciences (Turkish) 1984-2010
This e-journal is run by Ege University Faculty of Medicine,
Dept. of Neurological Surgery, Bornova, Izmir-35100TR
as part of the Ege Neurological Surgery World Wide Web service.
Comments and feedback:
E-mail: editor@jns.dergisi.org
URL: http://www.jns.dergisi.org
Journal of Neurological Sciences (Turkish)
Abbr: J. Neurol. Sci.[Turk]
ISSNe 1302-1664

REFERENCES

1. *Amery WK, Vandenbergh V. What can precipitating factors teach us about the pathogenesis of migraine. Headache 1987;27:146-50.*
2. *Beckham JC, Krug LM, Penzien DB et al. The relationship of ovarian steroids, headache activity and menstrual distress: a pilot study with female migraineurs. Headache 1992;32:292-7.*
3. *Blau JN. Migraine triggers: practice and theory. Path Biol 1992;40:367-72.*
4. *Burstein R, Jakubowski M. Unitary hypothesis for multiple triggers of the pain and strain of migraine. J Comp Neurol 2005;493:9-14.*
5. *Cady R, Schreiber C, Farmer K, Sheftell F. Primary headache: A convergence hypothesis. Headache 2002;42:204-16.*
6. *Chabriat H, Danchot J, Michel P, Joire JE, Henry P. Precipitating factors of headache. A prospective study in a national control-matched survey in migraineurs and nonmigraineurs. Headache 1999;39:335-8.*

7. *Cutrer MF. Migraine: does one size fit all?. Curr Opin Neurol 2003;16:315-7.*
8. *Dalessio DJ. Effort migraine. Headache 1974;14:53.*
9. *Drummond PD. Predisposing, precipitating and relieving factors in different categories of headache. Headache 1985;25:16-22.*
10. *Elrington G. Migraine: diagnosis and management. J Neurol Neurosurg Psychiatry 2002;72(Suppl 2): ii10-ii15.*
11. *Featherstone HJ. Migraine and muscle contraction headaches: a continuum. Headache 1985;25:194-8.*
12. *Gomersall JD, Stuart A. Variations in migraine attacks with changes in weather conditions. Int J Biometeorol 1973;17:285-99.*
13. *Guarnieri P, Radnitz CL, Blanchard EB. Assessment of dietary risk factors in chronic headache. Biofeedback Self Regul 1990;15:15-25.*
14. *Kallela M, Wessman M, Farkkila M, Palotie A, Koskenvuo M, Honkasalo ML, Kaprio J. Clinical characteristics of migraine in a population based twin sample: similarities and differences between migraine with and withou aura. Cephalalgia 1999;19:151-8.*
15. *Karlı N, Zarifoğlu M, Calışır N, Akgöz S. Comparison of pre-headache phases and trigger factors of migraine and episodic tension-type headache: do they share similar clinical pathophysiology? Cephalalgia 2005;25:444-51.*
16. *Kelman L. The triggers or precipitants of the acute migraine attack. Cephalalgia 2007;27:394-402.*
17. *Kohler T, Haimerl C. Daily stress as a trigger of migraine attacks: results of thirteen single subject studies. J Consult Clin Physiol 1990;58:870-72.*
18. *Launer LJ, Terwindt GM, Ferrari MD. The prevalence and characteristics of migraine in a population-based cohort: the GEM study. Neurology 1999;53:537-42.*
19. *Leston JA. Migraine and tension-type headache are not seperate disorders. Cephalalgia 1996;16:220-2.*
20. *Littlewood JT, Gibb C, Glover V et al. Red wine as a cause of migraine. Lancet 1988;1(8585): 558-9.*
21. *Robbins L. Precipitating factors in migraine: a retrospective review of 494 patients. Headache 1994;34:214-6.*
22. *Russell MB, Rasmussen BK, Fenger K, Olesen J. Migraine without aura and migraine with aura are distinct clinical entities: a study of 484 male and female migraineurs from the general population. Cephalalgia 1996;16:239-45.*
23. *Scharff L, Turk DC, Marcus DA. Triggers of headache episodes and coping responses of headache diagnostic groups. Headache 1995;35:397-403.*
24. *Schiffman SS, Buckley III CE, Sampson HA et al. Aspartame and susceptibility to headache. N Engl J Med 1987;317:1181-5.*
25. *Silberstein SD, Young WB. Migraine aura and prodrome. Semin Neurol 1995;45:175-82.*
26. *Spierings ELH, Ranke AH, Honkoop PC. Precipitating and aggravating factors of migraine versus tension-type headache. Headache 2001;41:554-8.*
27. *Van den Bergh V, Amery WK, Waelkens J. Trigger factors in migraine: a study conducted by the Belgian Migraine Society. Headache 1987;27:191-6.*
28. *Wöber C, Holzhammer J, Zeitlhofer J, Wessely P, Wöber-Bingöl Ç. Trigger factors of migraine and tension-type headache: experience and knowledge of the patients. J Headache Pain 2006;7:188-95.*