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ARTICLE

Trigger factors mainly from the environmental type are reported by adolescents with migraine

Fatores desencadeantes de migrânea relatados por adolescentes

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ABSTRACT

Migraine can be triggered by many factors such as stress, sleep, fasting and environmental causes. There are few studies that evaluated migraine trigger factors in the adolescent population. **Methods:** A total of 100 participants from 10 to 19 years were subjected to a detailed headache questionnaire, with demographic and clinical data, and a headache diary including trigger factors during a two-month period was asked. **Results:** Fifty of the participants exhibited chronic migraine and the other 50 participants demonstrated episodic migraine. The most common group of trigger factors reported was the environmental one, mainly sun/clarity, followed by hot weather and the smell of perfume. **Conclusions:** Ninety-one percent of children and adolescents with migraine reported a trigger factor precipitating the migraine attack.

Key words: migraine disorders, headache, adolescent, precipitating factors.

RESUMO

Crises de migrânea podem ser desencadeadas por muitos fatores, como estresse, sono, jejum e causas ambientais. Poucos estudos avaliaram os fatores desencadeantes de migrânea em adolescentes. **Métodos:** Cem pacientes, de 10 a 19 anos, foram submetidos a um questionário detalhado sobre sua cefaleia, com dados demográficos e clínicos e um diário da cefaleia, incluindo perguntas sobre os fatores desencadeantes, por um período de dois meses. **Resultados:** Cinquenta pacientes apresentavam migrânea episódica e 50, migrânea crônica. O grupo de fatores desencadeantes mais frequentemente relatado foi o ambiental, principalmente sol ou claridade, seguido pelo clima quente e pelo cheiro de perfume. **Conclusões:** Noventa e um por cento dos adolescentes com migrânea relataram pelo menos um fator desencadeante de crises álgicas.

Palavras-Chave: transtornos de enxaqueca, cefaléia, adolescentes, fatores desencadeantes.

Migraine is a chronic debilitating neurological condition, which can be elicited by several trigger factors. Migraine usually begins during childhood or adolescence and can remain with the patient for their entire life[1]. A migraine trigger is any factor that on exposure or withdrawal leads to the development of an acute migraine attack in a susceptible individual. Migraine triggers may be categorized as behavioral, environmental, infectious, dietary, chemical or hormonal[2].

Trigger factors are important in migraine management since their avoidance may result in a better control of the disorder. Several studies have consistently demonstrated that stress, lack of sleep and fasting are the most common trigger factors[3,4]; however, other factors such as alcohol intake, excessive caffeine consumption and hormonal factors in women have also been recognized. Despite its importance, little is known about migraine trigger factors in our society.

Many studies about migraine triggers have been performed; however, most of these studies examined adult migraine. In comparison, there is very sparse literature regarding triggers for childhood migraine. Furthermore, childhood migraine are significantly different from adult migraine in various aspects including gender, the duration and the site of pain localization[2].

The purpose of this study is to evaluate the trigger factors in adolescents with migraine chronic and episodic.

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METHODS

This study was performed between August 2010 and August 2011 at Federal University of São Paulo, Brazil. The participants were divided into two groups: adolescents with episodic migraine (EM) and adolescents with chronic migraine (CM). The subjects' age range was 10 to 20 years old. Migraine were defined according to the diagnostic criteria of the International Classification of Headache Disorders, Second Edition (ICHD-2)[5], and chronic migraine were defined according to the 2006 appendix criteria[6].

The exclusion criteria were: chronic diseases, secondary headaches, continuous usage of any type of medication and drug addiction. All of the subjects or their guardians provided written consent for their participation in the study, which was approved by the Ethics Committee of Federal University of São Paulo.

A predetermined list of trigger factors included dietary (chocolate, sausage, salami, monosodium glutamate, cheese, milk, aspartame, alcohol, red wine, white wine, coffee, soft drinks, citric fruits, ice cream and nuts), fasting, hormonal factors (menstruation, premenstrual and post-menstrual periods), sleep (oversleep, lack of sleep, changes in time of sleep, weekend sleep), stress (at work, at home and with family, crying, conflict, arguments and worries), physical activities and environmental (allergy, pollution, wind, rain, height, sun/clarity, cold weather, hot weather, changes in the weather, cigarette, air conditioning in the car, home or work, perfume odors, food, fat, cleaning products and gasoline).

Data analysis

Logistic regression models were used to evaluate the association of these trigger factors and migraine. The results of these models are shown as odds ratios (OR) and their 95% confidence intervals (CI). A p-value of less than 0.05 was considered to indicate statistical significance; all of the tests were two-tailed. These p-value and CI are based χ^2 distribution from the Wald test.

For individual triggers, it was performed only a descriptive analysis, containing the frequency distribution of assessed individuals second type of migraine.

RESULTS

A total of 131 subjects were included in this study. From this total, 31 subjects were excluded: 3 refused to participate in the study, 7 did not give reliable medical history information and 21 had exhibited at least one criterion for exclusion. The analysis of the remaining 100 subjects is shown below. Among them, 50 subjects had EM and 50 had CM.

The proportion of girls was higher in the chronic migraine group compared with the episodic migraine group (p=0.0093). The most common group of trigger factors reported was environmental, in both the episodic and chronic migraine groups. The main groups and their distribution are described in Table 1. Fasting was the most frequent individual trigger reported, mainly in girls with episodic migraine. Cold weather and wind were triggers only cited by girls.

The dietary triggers are listed in Table 2. The most frequent triggers were coffee, chocolate and ice cream. Chocolate was cited only by the chronic migraine group, and nuts, milk and aspartame did not cause attacks in any of the patients. Furthermore, approximately 97% of the girls with chronic migraine reported dietary trigger factors.

The environmental factors reported are described in Table 3. The most frequently reported was the sun/clarity in more than half of the patients, followed by hot weather and the smell of perfume. Cigarette smoking, as well as the smell of cleaning products and gasoline, were also.

Arguments, stress at school and worries were the main complaints among boys with chronic migraine. Moreover, other situations regarding daily routine were precipitating factors of migraine, as shown in Table 4. These items showed more significance in the group with chronic compared with episodic migraine.

The characteristics of sleep are listed in Table 5. The more frequent sleep triggers included a lack of sleep and oversleep, mainly in girls. Changes in the time of sleep, sleeping on weekends and napping were also reported.

Among hormonal factors in girls, menstruation and premenstrual periods were reported as triggering an attack in 8%.

Table 1. Trigger factors and gender of migraine patients according to the migraine type.

Trigger factors	Migraine				Total		OR (C/E)	95%CI	p-value
	Episodic (n=50)		Chronic (n=50)		(n=100)				
	n	%	n	%	n	%			
Female*	30	60.0	42	84.0	72	72.0	3.50	1.36–9.00	0.0093
Fasting	33	66.0	29	58.0	62	62.0	0.71	0.32–1.60	0.4106
Dietary*	13	26.0	23	46.0	36	36.0	2.42	1.04–5.63	0.0392
Sleep	31	62.0	36	72.0	67	67.0	1.58	0.68–1.58	0.2890
Physical activity	16	32.0	16	32.0	32	32.0	1.00	0.43–2.32	1.0000
Stress*	28	56.0	44	88.0	72	72.0	5.76	2.08–15.97	0.0008
Environmental*	37	74.0	46	92.0	83	83.0	4.04	1.22–13.43	0.0227

CI: confidence interval; OR (C/E): Odds Ratio (chronic/episodic); *statistical significance.

Table 2. Number and percentage distribution of dietary trigger factors in migraine patients according to their gender and migraine type.

Dietary trigger factors	Diagnosis								Total	
	Episodic				Chronic					
	Female		Male		Female		Male			
	n	%	n	%	n	%	n	%	n	%
Chocolate	0	0	0	0	8	19.51	1	12.5	9	9.00
Sausage	1	3.57	1	4.54	4	9.75	1	12.5	7	7.00
Salami	2	7.14	0	0	1	2.43	1	12.5	4	4.00
Monosodium glutamate	1	3.57	0	0	4	9.75	0	0	5	5.00
Cheese	0	0	1	4.54	1	2.43	0	0	2	2.00
Milk	0	0	0	0	0	0	0	0	0	0
Aspartame	0	0	0	0	0	0	0	0	0	0
Alcohol	3	10.71	0	0	0	0	0	0	3	3.00
Red wine	1	3.57	0	0	5	12.19	0	0	6	6.00
White wine	1	3.57	0	0	1	2.43	0	0	2	2.00
Coffee	5	17.85	0	0	8	19.51	1	12.5	14	14.00
Soft drinks	1	3.57	0	0	2	4.87	2	25	5	5.00
Citric fruits	0	0	0	0	1	2.43	0	0	1	1.00
Ice cream	2	7.14	3	13.63	4	9.75	0	0	9	9.00
Nuts	0	0	0	0	0	0	0	0	0	0
Fried foods	0	0	1	4.54	3	7.31	1	12.5	5	5.00

Table 3. Number and percentage distribution of environmental trigger factors in migraine patients according to their gender and migraine type.

Environmental trigger factors	Diagnosis								Total	
	Episodic				Chronic					
	Female		Male		Female		Male			
	n	%	n	%	n	%	n	%	n	%
Sun/Clarity	16	42.85	6	27.27	27	65.85	6	75	55	55.00
Cold weather	4	14.28	0	0	3	7.31	0	0	7	7.00
Hot weather	15	53.57	5	22.72	24	58.53	5	62.5	49	49.00
Changes in the weather	2	7.14	5	22.72	9	21.95	1	12.5	17	17.00
Cigarrete Smoking	11	39.28	3	13.63	19	46.34	3	37.5	36	36.00
Air conditioning	2	7.14	1	4.54	6	14.63	1	12.5	10	10.00
Smell of perfume	11	39.28	5	22.72	26	63.41	3	37.5	47	47.00
Smell of food	0	0	0	0	6	14.63	0	0	6	6.00
Smell of fat	1	3.57	0	0	7	17.07	2	25	10	10.00
Smell of cleaning products	9	32.14	1	4.54	19	46.34	3	37.5	32	32.00
Smell of gasoline	9	32.14	2	9.09	17	41.46	5	62.5	33	33.00
Allergy	5	17.85	1	4.54	3	7.31	0	0	9	9.00
Pollution	13	46.42	3	13.63	5	12.19	2	25	23	23.00
Wind	3	10.71	0	0	3	7.31	0	0	6	6.00
Rain	3	10.71	1	4.54	2	4.87	1	12.5	7	7.00
Height	0	0	0	0	0	0	0	0	0	0

Table 4. Number and percentage distribution of stress trigger factors in migraine patients according to their gender and migraine type.

Stress trigger factors	Diagnosis								Total	
	Episodic				Chronic					
	Female		Male		Female		Male			
	n	%	n	%	n	%	n	%	n	%
Stress at school	11	39.28	3	13.63	24	58.53	6	75	44	44.00
Stress at home	2	7.14	1	4.54	13	31.7	2	25	18	18.00
Stress with family	4	14.28	2	9.09	9	21.95	3	37.5	18	18.00
Crying	7	25	2	9.09	16	39.02	3	37.5	28	28.00
Conflict	4	14.28	3	13.63	12	29.26	3	37.5	22	22.00
Argument	12	42.85	4	18.18	29	70.73	5	62.5	50	50.00
Worries	9	32.14	4	18.18	28	68.29	2	25	43	43.00

Table 5. Number and percentage distribution of sleep trigger factors in migraine patients according to their gender and migraine type.

Sleep trigger factors	Diagnosis								Total	
	Episodic				Chronic					
	Female		Male		Female		Male			
	n	%	n	%	n	%	n	%	n	%
Oversleep	12	42.85	5	22.72	14	34.14	0	0	31	31.00
Lack of sleep	9	32.14	8	36.36	25	60.97	4	50	46	46.00
Changes in time of sleep	3	10.71	2	9.09	4	9.75	2	25	11	11.00
Weekends	0	0	1	4.54	4	9.75	0	0	5	5.00
Napping	4	14.28	1	4.54	5	12.19	0	0	10	10.00

DISCUSSION

Triggers are not universal; moreover, the presence of a trigger factor does not always precipitate an attack in the same individual. The hypotheses of Lambert[7] showed that most triggers excite cortical neurons, which leads to an inhibitory response in the periaqueductal gray matter and the nucleus raphe magnus through the trigeminal nucleus, which can be perceived as migraine pain. Other hypotheses argue that trigger factors may induce the onset of the cortical spreading of depression in a pre-existing hyperexcitable cortex of a migraine brain, which initiates the process of pain generation[8].

Few studies have been dedicated to the study of trigger factors in adolescents with migraine. In our study, only 4% of patients showed a lack of trigger factors for painful migraine attacks and 91% showed two or more. Consistent with our results, Chakravarty et al. found 6% of patients with migraine that were elicited without trigger factors[2].

Stress, dietary and environmental triggers were different when compared the chronic with the episodic groups. Neut et al. found that dietary and mild trauma triggers were different in migraine with and without aura[9].

In the present study, the triggers most frequently reported were environmental ones, followed by stress and sleep triggers. In a study conducted by Chakravarty[2], the triggers most frequently reported were stress followed environmental triggers, and in the study performed by Neut et al.[9] were stress followed sleep deprivation. This difference, regarding our study, can be explained by ethnic, climatic, dietary and sociocultural factors. In a Brazilian study in adults, Fukui et al. found that dietary triggers most commonly followed sleep and environmental triggers[1]. This may be explained by the different habits exhibited among children and adults.

Furthermore, coffee and chocolate were the dietary triggers that were most cited in our study. In adults, alcohol was the most cited dietary trigger, followed by chocolate[1]. In Indian and French children, chocolate was the most cited dietary trigger[2,9,10].

Among the environmental triggers examined, the sun/clarity, hot weather and the smell of perfume were the most frequently cited triggers in our study. In the study conducted by Neut et al.[9], hot weather was the most frequent migraine trigger; however, the smell of perfume was not evaluated. According to the literature, sleep deprivation was the most frequently cited sleep trigger[1,2,9]. Bruni et al.[11] showed that enhancing sleep quality resulted in a reduction of migraine frequency.

In conclusion, our study indicates that 91% of children and adolescents with migraine reported a trigger factor that precipitated the attack. In addition, the most common trigger factor was environmental. The stress trigger showed a statistically significant difference between the groups of migraine, being most often cited in the group of chronic migraine.

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