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Original

Perceived migraine triggers; do dietary factors play a role?

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Abstract

The present cross-sectional study was designed to assess the frequency of 36 possible triggering factors precipitating a migraine crisis (hormonal, environmental, and dietary) in adult outpatients suffering from migraine attacks. A group of 123 migraine sufferers, aged 43.2 ± 13.9 (mean ± SD) years, including 114 (92.7%) women, 68.3% having migraine without aura, 68.3% reporting pain severe enough to require drug prophylaxis, and 29.3% presenting with hypertension, were evaluated. The most common triggers were stress and fasting, and environmental and hormonal factors were frequently found to precipitate a crisis. More than 90% of the patients reported susceptibility to 5 or more factors, and only 2.4% did not complain about any dietary factor. The large number of triggers detected in the present study emphasises the importance of awareness and avoidance of these factors in the management of patients with migraine.

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Key words: *Food and beverages. Migraine disorders. Migraine with aura. Migraine without aura. Precipitating factor.*

FACTORES DESENCADENANTES DE MIGRAÑA; ¿LOS FACTORES DIETETICOS TIENEN INFLUENCIA?

Resumen

El presente es un estudio transversal que fue diseñado para estimar la frecuencia de 36 posibles factores desencadenantes de iniciar una crisis de migraña (hormonales, ambientales y dietéticos) en pacientes adultos ambulatoriales que sufren ataques de migraña. Fue evaluado un grupo de 123 adultos que sufre de migraña, con edades entre 43,2 ± 13,9 (media ± DE), incluyendo 114 (92,7%) mujeres con migraña sin aura, 68,3% de las quales informaron sentir dolor suficiente como para requerir profilaxis con fármacos y 29,3% con hipertensión. Los factores desencadenantes más comunes fueron el estrés y el ayuno; factores ambientales y hormonales fueron también desencadenantes frecuentes. Más del 90% de los pacientes informaron susceptibilidad a 5 o más factores, y sólo el 2,4% no informó de ningún factor dietético. El gran número de factores desencadenantes detectados en el presente estudio enfatiza la importancia del cuidado y la prevención de estos factores en el manejo de pacientes con migraña.

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Palabras clave: *Alimentos y bebidas. Trastorno de la migraña. La migraña con aura. Migraña sin aura. Factor desencadenante.*

Abbreviations

MA: Migraine with aura.
MWA: Migraine without aura.
MDC: Chronic daily migraine.
HCPA: Hospital de Clínicas de Porto Alegre.
ABEP: Brazilian Association of Research Companies.
MIDAS: The Migraine Disability Assessment Test.

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Introduction

Migraine is a highly prevalent and disabling subtype of primary headache[1] and a benign neurological disorder.[2] It is characterised by unilateral throbbing pain, which is moderate to severe in intensity and associated with nausea and/or vomiting, phonophobia, and photophobia lasting 4-72 hours, and may or may not be preceded by focal symptoms called an aura. A migraine occurring on more than 15 days within a month is considered chronic; an episodic headache can be divided into migraine with aura (MA) and migraine without aura (MWA), the latter being the more prevalent type.[1]

Among adults, migraine affects more women than men[3] and is more prevalent among Caucasian Americans than among Asians.[4] It is estimated that 11% of the

adult population worldwide suffers from migraine.[5] In Brazil, an epidemiological study revealed an annual prevalence of 15.2%, with migraine being 2.2 times more common in women and having a 1.5-times higher prevalence in individuals with a high educational level.[6] Migraine crises also impact the quality of life, affecting the daily activities of patients and resulting in individual suffering and economic losses due to decreased attendance and productivity in the workplace, as well as other direct and indirect costs.[7]

Several factors, including dietary, hormonal, and environmental parameters, can trigger migraine in susceptible individuals,[8] and exposure to these factors may precede the crisis by up to 48 hours.[9] Among the main non-nutritional factors are stress, hormonal changes (related to contraceptive use or the menstrual cycle), psychological aspects, fatigue, imbalances in sleep duration (increased or decreased), change in routine, use of drugs and tobacco, susceptibility to odours, exercise, light, climate change, and high altitudes.[10,11] The dietary factors include consumption of chocolate, cheese, citrus fruits, alcohol, aspartame, monosodium glutamate, a fat-rich diet, dairy products, and caffeine; skipped meals or fasting; and deprivation or insufficient intake of water.[12,13]

To reduce the frequency, intensity, and duration of attacks, important therapeutic steps include the recognition, minimisation, and avoidance of triggering factors.[14,15]

There are several reports suggesting some influence of nutrients on neurological disorders prevention or treatment.[16] However, the contribution of dietary factors to the aetiology of migraine is still debated, with certain studies demonstrating that nutrition has limited importance. Evaluating the role of diet as a migraine trigger or an aggravating factor is complex, because the relationship between dietary factors and the onset of migraine relies primarily on subjective information reported by the patients; moreover, the presence of a trigger factor does not always precipitate an attack in the same individual. In some cases, a combination of factors may cause the crisis. Individual susceptibility to specific foods should be critically examined, and food confirmed as a trigger should be avoided. However, generalised dietary restrictions have not been shown to be consistently effective.[15]

Although a wide variety of prophylactic medications is available for headaches, most patients do not show a significant decrease in frequency and severity of symptoms without appropriate changes in their lifestyle. These changes include dietary alterations, regular aerobic exercise and sleep, and stress monitoring.[14]

Considering the importance of recognising triggers and the inconsistency in the observed manifestation of the crisis with regard to intra- and interpersonal variations, this study aimed to evaluate the frequency of migraine attacks in outpatients and whether exposure to these factors induces only occasional attacks or consistently acts as a trigger.

Methods

This was a cross-sectional study with convenience sampling, which included patients of ≥18 years of age of both genders who were undergoing treatment at the Outpatient Headache Neurology Service of the Hospital de Clinicas de Porto Alegre (HCPA), Rio Grande do Sul, between March and November 2010; migraine was diagnosed by a neurologist according to the criteria of the International Headache Society.[1]

Socio-demographic (age, sex, marital status, education level, ethnicity, and socioeconomic status) and clinical (type of migraine, frequency and duration of crises, family history, and medication) variables and the impact of migraine on quality of life were documented by personal interview during a consultation conducted by the examiner. The impact on quality of life and economic status were evaluated using the criteria from The Migraine Disability Assessment Test (MIDAS)[17] and the Brazilian Association of Research Companies (ABEP), respectively (ABEP: Economic Classification Criterion categorises the purchasing power of the population into 5 groups from A to E, the first representing the richest portion of society and the last, the poorest).[18]

Triggering factors experienced by the patients were determined using a selected list of 36 items, including 14 factors unrelated to diet (hormonal or environmental) and 22 dietary factors.

The study was approved by the Ethics Committee in Research at HCPA (Protocol. Number 09-523), and all participants signed a consent form.

Categorical variables are presented as frequencies and percentages; continuous variables, as mean and standard deviation. The χ^2 test was used to test the association between categorical variables. Data were analysed using the Statistical Package for Social Sciences (SPSS) 18.0 and were considered statistically significant when the p value was ≤ 0.05.

Results

A total of 123 adult patients of both genders were evaluated, but the studied population was predominantly female (n = 114, 92.7%), aged 43.2 ± 13.9 years (mean ± SD), with a significant percentage (30.9%) having had less than 8 years of schooling, including 4 illiterate patients (3.3% of the sample). The patients were mainly from economic classes B and C, white, and married or with stable relationship (table I). Among the patients, 60 (48.8%) were regularly employed, but 46,6% (28/60) reported absenteeism due to migraine.

Most patients reported a family history of migraine, a high frequency of migraine without aura, and an age at onset of below 20 years. The duration of migraine was 19.6 ± 14.1 years (mean ± SD). Patients were classified into MIDAS grades I to IV and the usual attack duration was up to 24 hours. Sixty six percent of the

Table I
Social and demographic characteristics of outpatients with migraine

Characteristics	*Frequency and Percentage or Mean ± SD (range)*
Gender	
Female	114 (92.7%)
Male	9 (7.3%)
Age	43.2 ± 13.9 (18-72)
≤ 29 years	24 (19.5%)
30 to 39 years	26 (21.1%)
40 to 49 years	28 (22.8%)
50 to 59 years	31 (25.2%)
≥ 60 years	14 (11.4%)
Education Level	
Unlettered/< 8 years of education	38 (30.9%)
8 years of education	27 (21.9%)
11 years of education	45 (36.5%)
> 11 years of education	13 (10.5%)
Economic class - ABEP	
A	7 (5.7%)
B	53 (43.0%)
C	55 (44.7%)
D	8 (6.5%)
Race	
White	87 (70.7%)
Black	12 (9.8%)
Mulatto	12 (9.8%)
Others	12 (9.8%)
Civil Status	
Single	39 (31.7%)
Married/Stable relationship	69 (56.1%)
Divorced	8 (6.5%)
Widowed	7 (5.7%)

ABEP: Brazilian Association of Research Companies.[18]

patients reported scores ranging from 8 to 10 degrees on the visual analogue scale of pain and 68.3% were receiving prophylactic medication. High blood pressure was the most common comorbidity (table II).

Among the dietary factors, fasting or skipped meals were found to be almost as frequent triggers as stress, and consumption of alcoholic drinks (distilled) represented the second most common cause of migraine crises, followed by caffeine withdrawal, fried or fatty foods, and beer. Environmental and hormonal factors were among the most common detected triggers related to migraine attacks and included stress, sleep, odour, noise, menstruation, fatigue, and exposure to light. Among these, with the exceptions of physical exercise and medication use, most factors were more often a consistent than occasional trigger. Among the dietary factors, consumption of chocolate, caffeine, ice cream, cheese, tea, cola-based soft drinks, milk and Chinese food were experienced more often occasionally than consistently (fig. 1).

Table II
Clinical data of outpatients with migraine

Characteristics	*Frequency and Percentage or Mean ± SD (range)*
Migraine	
MA	39 (31.7%)
MWA	84 (68.3%)
Age at onset (years)	23.9 ± 14.3 (4-66)
≤ 10	25 (20.3%)
11 to 20	37 (30.1%)
21 to 30	28 (22.8%)
≥ 31	33 (26.8%)
Men	32.2 ± 16.0 (8-52)
Women	23.3 ± 14.1 (4-66)
Disease duration (years)	19.6 ± 14.1 (0-53)
Family history of migraine	88 (71.5%)
Prophylactic medication	
Yes	84 (68.3%)
Tricyclic	46 (37.4%)
Anticonvulsant	22 (17.9%)
Beta adrenergic blockers	24 (19.5%)
Calcium channel blocker	3 (2.4%)
Antipsychotic	1 (0.8%)
Visual analogue scale	
0 to 4	5 (4.1%)
5 to 7	37 (30.1%)
8 to 10	81 (65.9%)
MIDAS degree	
I	49 (39.8%)
II	27 (22.0%)
III	25 (20.3%)
IV	22 (17.9%)
Number of crises in 6 months	28.8 ± 22.7 (0-72)
Duration of crises (hours) (n = 122)	33.8 ± 41.4 (1-312)
≤ 2	17 (13.9%)
3 to 24	66 (54.1%)
25 to 48	16 (13.1%)
49 to 72	16 (13.1%)
≥ 73	7 (5.7%)
Days lost from work or school/3 months (n = 36)	3.3 ± 3.3 (1-15)
Comorbidities	
Diabetes	2 (1.6%)
Hypertension	36 (29.3%)
Neuropsychiatric diseases	7 (5.7%)
Thyroid disease	7 (5.7%)

MA: Migraine with aura; MWA: Migraine without aura; MIDAS: Migraine Disability Assessment Test.[17]

Most patients reported susceptibility to 5 or more different triggers, which included mainly environmental and hormonal factors. Only 2.4% of the patients reported no susceptibility to any dietary trigger (fig. 2).

Regarding the effect of environmental factors on the migraine sub-types with and without aura (MA and

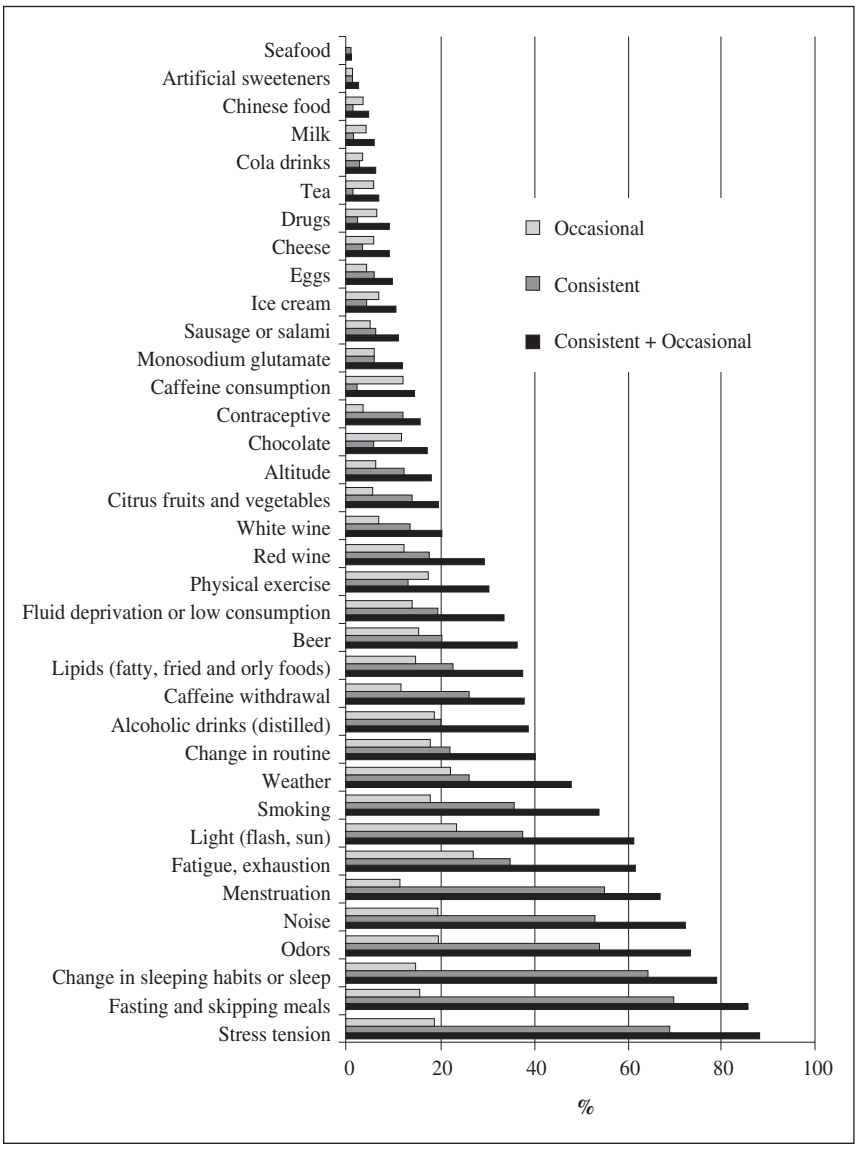

Fig. 1.—Attacks triggered by exposure to various factors. Percentages relative to 123 patients or the number of patients who consume a dietary item [withdrawal of caffeine (n = 122), alcoholic drinks (distilled) (n = 96), beer (n = 96), red wine (n = 92), chocolate (n = 122), white wine (n = 88), sausage or salami (n = 117), ice cream (n = 122), monosodium glutamate (n = 119), eggs (n = 121), cheese (n = 121), cola drinks (n = 117), milk (n = 119), tea (n = 122), Chinese food (n = 86), artificial sweeteners (n = 82), seafood (n = 98)], perform physical exercise (n = 122), have experienced high altitude (n = 116), or are female [contraceptive use (n = 107), menstrual bleeding (n = 114)].

MWA), exposure to light was a significant potential trigger in patients presenting with MA (p = 0.023) (fig. 3A). Likewise, among the dietary factors, this relationship was also observed for beer (p = 0.006) and citrus fruits and vegetables (p = 0.017) (fig. 3B).

Discussion

The present study reveals a high frequency of possible migraine triggers, emphasising the importance of awareness and avoidance of trigger factors as part of the management plan. Remarkably, stress was the most frequently found factor, leading us to suggest that this finding should be considered a priority during patient examination and interview. Interestingly, with the exception of fasting and skipped meals, environmental and hormonal factors were, in most cases, related to a higher occurrence of the migraine crises.

Non-dietary factors were potentially able to precipitate crises when experienced by individuals with susceptibility to these factors. Exposure to light and some dietary factors are most frequently mentioned as potential triggers in patients with MA.

A recent search of the literature revealed only 2 Brazilian studies directly related to this subject,[3,19] emphasising the importance of the present approach. However, as in most of the other studies, our data was also based on a retrospective analysis. The possibility of selective memory in these patients as well as their need of plausible causal explanations may bias this information. Moreover, the results could reflect a decrease in consumption of items considered triggering factors.[20] Despite these potential limitations, this study provides a preliminary mapping of these aspects at the national epidemiological level. To minimise potential bias in the present study, we asked whether the patients

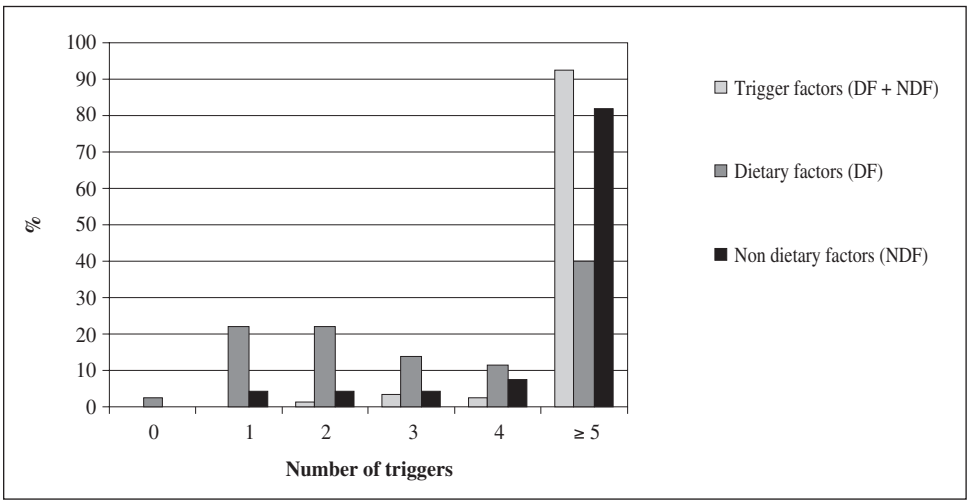

Fig. 2.—Total number of trigger factors, dietary and non-dietary, as reported by patients with migraine. Bars represent the percentage of patients who were susceptible to the factors.

consumed a given factor or were exposed to environmental or hormonal factors.

As previously reported,[3,6] we also found a predominance of female patients with migraine. The mean age of onset was higher in males than in females, unlike the findings reported by Stewart et al.[15] However, this finding should be interpreted with caution because of the small number of male patients and potential bias in our study. Although migraine is more prevalent in Caucasian Americans,[4] it cannot be concluded that the large number of white patients in this study derived from this factor, since the population in southern Brazil is predominantly Caucasian. Our data did not confirm the higher prevalence of migraine in patients with a high educational level, described by Queiroz et al.[6] This may be because patients in our study were recruited in a public institution, where highly educated patients are relatively less common, and because the frequency distribution of migraine is relatively equitable among different levels of education.

Likewise, in the case of outpatients, it was not surprising to find the severity of pain assessed by the visual analogue scale and high absenteeism among the working individuals.[7] The higher frequency of migraine without aura observed also confirms its higher prevalence in previous studies.[1]

Among the most quoted dietary triggers, fasting or skipped meals was significantly more common (85.3%), with a frequency equivalent to that of stress. The frequency of migraines we observed in patients reporting fasting as a trigger was similar to that in previous studies that reported a frequency ranging from 40% to 82%.[3,21,22] A positive association between fasting and severe migraine was found by Chakravarty et al.,[23] however, a recent study has contradicted this association.[24]

Stress, in turn, was the most prevalent trigger in the present study, which concurs with the literature.[10] According to Fukui et al.,[3] this finding suggests that psychological management may be important in these patients, in combination with dietary guidance.

Few studies have analysed the co-occurrence of dietary and other factors as precipitating factors for migraines.[3,25] Among these, the study by Fukui et al.[3] found that 95.5% of patients reported at least 2 factors. Similarly, in the present study, all patients reported at least 2 factors among those listed, indicating the possibility of interaction among multiple factors. The study by Peatfield,[26] for example, suggests that there is an overlap in the susceptibility to red wine, beer, cheese, and chocolate, which may indicate a metabolic relationship among these susceptibilities.

Wöber et al.[10] found that the most frequent factors caused only occasional and varying headache attacks. In contrast, in our study, crises always occurred when the patients were exposed to any of the 16 most frequently reported triggers. However, these observations were opposite for the dietary factors in our present study. We observed that environmental and hormonal factors appear to be likely to consistently trigger a crisis.

One important observation about different types of migraine relates to MA and light exposure. In an extensive analysis reported by Kelman,[25] it was concluded that susceptibility to light occurs in MA. Moreover, a higher susceptibility was found in patients with MA who were exposed to stress, sleep disturbances, odours to which they were sensitive, heat, and exercise. Interestingly, a previous study by Ierusalimschy and Moreira Filho,[19] which did not address the importance of the different migraine subtypes, showed the same frequency of attacks (as found in the present study) in patients presenting with MA in response to light exposure. However, Fukui et al.[3] have found lower frequencies.

We do not find any evidence in the literature that supports the hypothesis of an association between beer and citrus fruits and development of a migraine crisis in MA, as seen in this study. However, a general association between foods or dietary factors has been shown in studies by Kelman[25] and Karli et al.[21] Despite reports showing that fasting or skipping meals and alcohol are capable of triggering MA,[25] the frequencies found in our

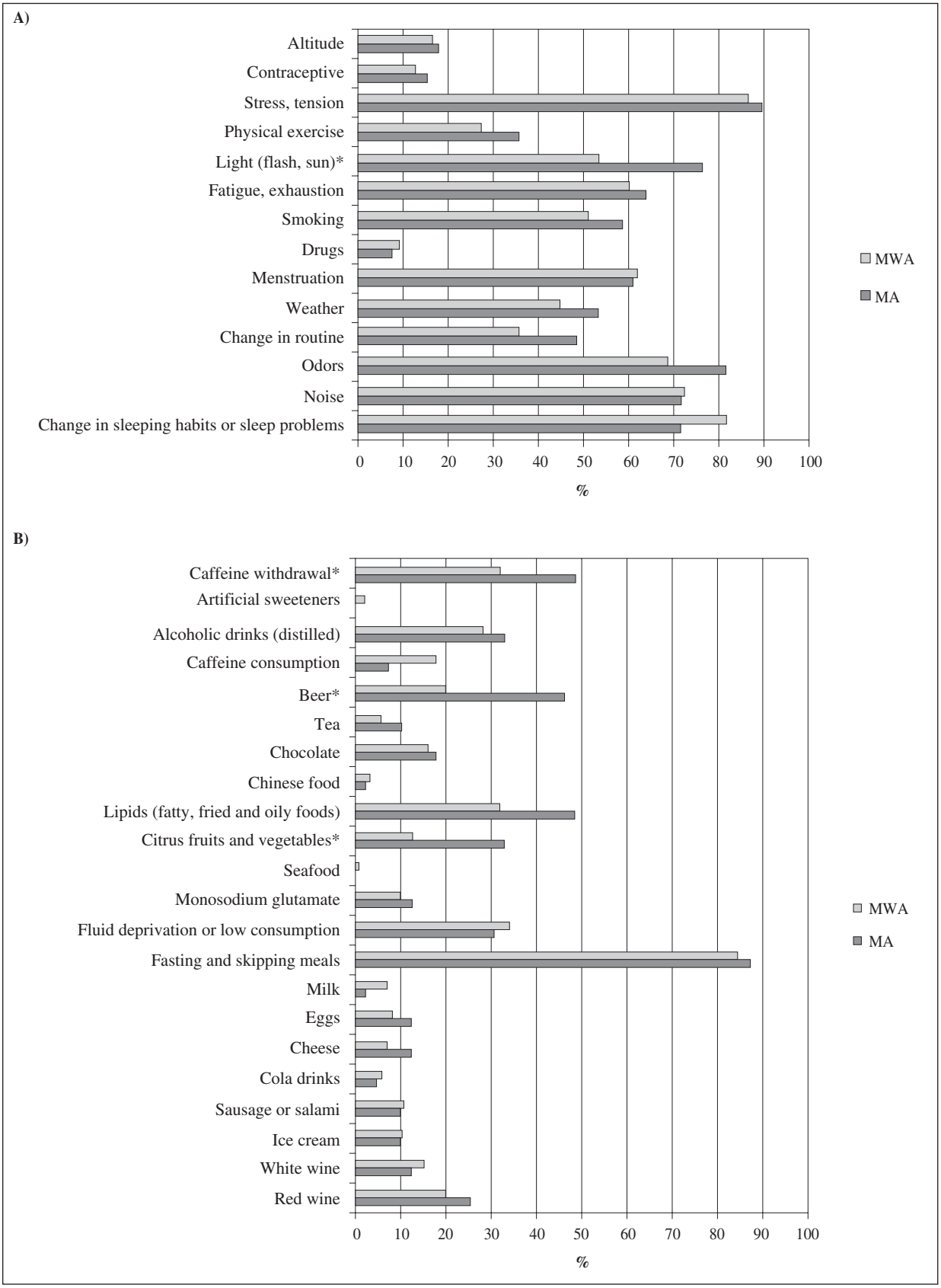

*Fig. 3.—A) Potential environmental and hormonal MA and MWA triggers. B) Potential dietary MA and MWA triggers. Bars represent the percentage of patients who reported occasional or consistent susceptibility. * $p < 0.05$ between MA and MWA (χ^2). MA = Migraine with aura; MWA = Migraine without aura.*

study were similar for both types of migraine. In contrast, caffeine was associated with a greatly increased MWA frequency in those who were susceptible to it, although there was no significant difference between migraine types with respect to triggering of crises.

The significance of environmental and hormonal parameters, which are widely recognised to precipitate migraines, is also supported by our study. The role of dietary triggers is, however, still controversial in the literature. The current study detected a lower frequency of attacks triggered by dietary factors as compared to non-dietary factors; however, the former are equally important, especially those related to fasting, abstinence from caffeine, and distilled alcoholic drinks.

The present results corroborate the importance of searching for alternative solutions for migraine prophylaxis; it is important to consider non-pharmacological options, such as psychological management and dietary changes. However, it is also important to educate patients about potential factors based on scientific evidence, focusing on those factors that can be modified. Therefore, longitudinal prospective and controlled studies are required to prove the experimental and actual relationships between migraine and its precipitating factors, especially dietary ones, as well as possible interactions between factors.

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References

1. IHS. International Headache Society. The International Classification of Headache Disorders —Part One— The primary headaches. *Cephalalgia* 2004; 24 (Suppl. 1): 23-136.
2. Waeber C, Moskowitz MA. Therapeutic implications of central and peripheral neurologic mechanisms in migraine. *Neurology* 2003; 61 (8) (Suppl. 4): S9-S20.
3. Fukui PT, Gonçalves TRT, Strabeli CG et al. Trigger Factors in migraine patients. *Arq Neuropsiquiatr* 2008; 66 (3-A): 494-499.
4. Stewart WF, Lipton RB, Liberman J. Variation in migraine prevalence by race. *Neurology* 1996; 47 (1): 52-59.
5. Stovner LJ, Hagen K, Jensen R, Katsarava Z, Lipton RB, Scher AI et al. The global burden of headache: a documentation of headache prevalence and disability worldwide. *Cephalalgia* 2007; 27: 193-210.
6. Queiroz LP, Peres MFP, Piovesan EJ, Kowacs F, Ciciarelli MC, Souza JA et al. A nationwide population-based study of migraine in Brazil. *Cephalalgia* 2009; 29: 642-649.
7. Friedman DI, De Ver Dye T. Migraine and the Enviroment. *Headache* 2009; 49 (6): 941-952.
8. Zagami AS, Bahra A (2006) Symptomatology of migraines without aura. In: Olesen J, Goadsby PJ, Ramadan NM et al (ed) The Headaches, 3rd edn. Lippincott Williams & Wilkins, Philadelphia, pp. 399-405.
9. Martin PR. Behavioral Management of Migraine Headache Triggers: Learning to Cope with Triggers. *Curr Pain Headache* 2010; Rep 14: 221-227.
10. 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: 188-195.
11. Millichap JG, Yee MM. The diet factor in pediatric and adolescent migraine. *Pediatr Neurol* 2003; 28: 9-15.
12. Holzhammer J, Wöber C. Alimentäre Trigerfaktoren bei Migräne und Kopfschmertz von Spannungstyp. *Schmerz* 2006; 20: 151-159.
13. Blau JN, Kell CA, Sperling JM. Water-deprivation: a new headache with two variants. *Headache* 2004; 44: 79-83.
14. Sun-Edelstein C, Mauskop A. Foods and supplements in the management of migraine headaches. *Clin J Pain* 2009; 25 (5): 446-442.
15. Stewart WF, Linet MS, Celentano DD, Van Natta M, Ziegler D. Age- and sex-specific incidence rates of migraine with and without visual aura. *Am J Epidemiol* 1991; 134 (10): 1111-20.
16. Vilà MP, Benagés EI, Peláez RB, Casas NV, Ochoa DR , Luna PPG, Paris AS, Álvarez Ballano D, García PD, Callao FL, Gamboa RA, Velasco M, García-Peris P, González EC, Giner CP, Corrales GP, de Lorenzo y Mateos AG, Montes JAR, Hernández JA. Relaciones entre el sistema nervioso y la nutrición clínica. *Nutr Hosp* 2009; 2 (2).
17. Stewart WF, Lipton RB, Kolodner K, Liberman J, Sawyer J. Reliability of the migraine disability assessment score in a population-based sample of headache sufferers. *Cephalalgia* 1999; 19: 107-114.
18. ABEP-Associação Brasileira de Empresas de Pesquisa. Critério de Classificação Econômica Brasil [document on the Internet]. 2011 [cited 2011 April 06]. Available from: http://www.abep.org.
19. Ierusalimschy R, Moreira Filho PF. Precipitating factors of migraine attacks in patients with migraine without aura. *Arq Neuropsiquiatr* 2002; 60 (3-A): 609-613.
20. Wöber C, Brannath W, Schmidt K, Kapitan M, Rudel E, Wessely P et al. Prospective analysis of factors related to migraine attacks: the PAMINA study. *Cephalalgia* 2007; 27: 304-314.
21. Karli N, Zarifoglu M, Calisir N, Akgoz 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: 444-451.
22. Spierings ELH, Ranke AH, Honkoop PC. Precipitating and Aggravating Factors of Migraine Versus Tension-type Headache. *Headache* 2001; 41: 554-558.
23. Chakravarty A, Mukherjee A, Roy D. Trigger factors in childhood migraine: a clinic-based study from eastern India. *J Headache Pain* 2009; 10 (5): 375-380.
24. Milde-Busch A, Blaschek A, Borggräfe I, Heinen F, Straube A, von Kries R. Associations of Diet and Lifestyle With Headache in High-School Students: Results From a Cross-Sectional Study. *Headache* 2010; 50: 1104-1114.
25. Kelman L. The triggers or precipitants of the acute migraine attack. *Cephalalgia* 2007; 27 (5): 394-402.
26. Peatfield RC. Relationships between food, wine, and beer-precipitated migrainous headaches. *Headache* 1995; 35: 355-357.