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## Some lifestyle habits of female Belgrade university students with migraine and non-migraine primary headache

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**Abstract** We performed a prevalence study to compare some lifestyle habits between subjects with migraine and those with non-migraine primary headaches. We surveyed female students in randomly selected classes of the School of Medicine and the School of Pharmacy, Belgrade University. Among all observed students (1943 subjects), 245 had migraine and 1053 had non-migraine primary headache. According to multivariate logistic regression analysis, the following factors were associated with migraine: irregular eating (odds ratio (OR)=1.99; 95% confidence interval (95% CI), 1.69 to 2.34;  $p<0.01$ ), sleep duration shorter than usual (OR=1.18; 95% CI 1.00 to 1.38;  $p=0.0449$ ) and smoking >10 cigarettes per day (OR=1.18; 95% CI=1.00 to 1.39;  $p=0.0433$ ). The

results of the present study are in line with some other investigations suggesting that some lifestyle habits probably play a role as migraine precipitants.

**Key words** Migraine • Non-migraine primary headaches • Lifestyle habits • Female students • Epidemiology

### Introduction

An increasing body of evidence from migraine research, particularly migraine pathophysiology, indicates that migraine sufferers have a unique phenotype of attacks with underlying specific biotype of migraine disorder, namely “the sensitive brain” [1–3]. Such a defective pain control system is unstable and may respond by a continuous discharge when subjected to stimulation from higher centers (e.g. cortex, hypothalamus) as the result of stress or by excessive afferent input from the special senses or from

cerebral or extracranial vessels [4]. Precipitants are not universal because the presence of a factor does not always trigger an attack in the same person, and only subgroups of headache sufferers are sensitive to any specific factor. Therefore a multifactorial trigger mechanism for particular attacks has been suggested [5]. It is more likely that endogenous and exogenous factors must coincide in order to precipitate attacks in most migraineurs.

This paper presents data about some lifestyle habits of female Belgrade University students suffering from migraine in comparison with students with non-migraine primary headache.

1. Have you ever had at least one headache not due to head injury, hangover, pregnancy, or an illness such as cold or flu?	1. NO	2. YES
2. If YES, have you always had a similar type of headache?	1. NO	2. YES
3. If NO, how many different types of headache do you have: a. One b. Two c. Three d. More (how many: _____).		
The following questions define your the most severe type of headache:		
4. Define the level of your headache on a scale of 1 to 10:	_____	
5. At what age did your headache begin?	_____	
6. What is the frequency of your headache?	Monthly: _____	Per year: _____
7. What is the number of occurrence of your headache: a. 1-4 b. 5-10 c. 11 or more		
8. What is the average duration of your headache (in hours)?	_____	
9. Have you ever had unilateral headache?	1. NO	2. YES
10. If YES, how often (frequently)? a. Rarely                      b. Half the time c. Often                        d. Always		
11. Have you ever had pulsatile headache?	1. NO	2. YES
12. If YES, how often: a. Rarely                      b. Half the time c. Often                        d. Always		
13. Has your headache ever been exacerbated by physical activity?	1. NO	2. YES
14. If YES, how often? a. Rarely                      b. Half the time c. Often                        d. Always		
15. Has your headache ever been associated with nausea?	1. NO	2. YES
16. If YES, how often? a. Rarely                      b. Half the time c. Often                        d. Always		
17. Has your headache ever been associated with vomiting?	1. NO	2. YES
18. If YES, how often? a. Rarely                      b. Half the time c. Often                        d. Always		
19. Has your headache ever been associated with the photophobia?	1. NO	2. YES
20. If YES, how often? a. Rarely                      b. Half the time c. Often                        d. Always		
21. Has your headache ever been associated with phonophobia?	1. NO	2. YES
22. If YES, how often? a. Rarely                      b. Half the time c. Often                        d. Always		
23. Have you ever had any of the following symptoms before or during headache: a. Homonymous visual disturbance b. Unilateral paresthesia or numbness c. Unilateral weakness d. Aphasia or unclassifiable speech difficulty	1. NO 1. NO 1. NO 1. NO	2. YES 2. YES 2. YES 2. YES
24. If YES, how did the symptoms develop? a. Immediately              b. Gradually, over more than 4 minutes		
25. What is the duration of such symptoms: a. Less than 1 h              b. More than 1 h		
26. When did these symptoms occur: a. Less than 1 h before headache b. Simultaneously with your headache c. After the occurrence of your headache		

**Fig. 1** The questionnaire for migraine and headache

## Materials and methods

The study was conducted in Belgrade from February to June 2000. The investigation comprised female students of the School of Medicine and the School of Pharmacy of University of Belgrade, Yugoslavia. A questionnaire (Fig. 1) was administered to 1943 students during randomly selected classes. In addition to personal data, participants were asked whether they ever had experienced at least one headache, which was not caused by a head injury, pregnancy, hangover, or acute illness. Detailed questions were asked regarding the most severe type of headache: the duration of the headache, the frequency of headache, the average number of headache attacks per month or per year, as well as regarding the duration, location, quality, and intensity of their headache, the influence of physical activity upon their headache, the occurrence of nausea, vomiting, photophobia, or phonophobia, and the occurrence and duration of associated neurological symptoms. The main purposes of the study were to estimate the prevalence of migraine and non-migraine primary headache [6], and at the same time to obtain data about hormonal characteristics and regularity of sleeping, eating and smoking habits. The study was conducted according to the ethical principles established in the Declaration of Helsinki.

Migraine diagnosis was assigned using criteria of the International Headache Society [7] and MacGregor's stricter definition [8] of "menstrual migraine" as migraine attacks exclusively starting on the first day of menstruation  $\pm 2$  days and at no other time of the menstrual cycle. "Menstrually associated migraines" were defined as migraine attacks occurring not only at menses, but also at other times of the month and aggravated during menstruation. "Premenstrual migraine" was defined as migraine attacks occurring 2–7 days prior to the onset of menses. "Menstrually unchanged migraine" was defined as migraine that occurs at menses and at other times of the month, and does not change during menstruation. Migraines unrelated to menses, as well as the primary non-migraine headaches related to the menstrual cycle in the same way as migraines, were also analyzed.

In the analysis of data obtained, proportions, chi-square test and multivariate logistic regression analysis were used.

In this paper only data about lifestyle habits of female students with migraine and non-migraine primary headaches are presented.

## Results

Of 1943 female students (18–28 years of age), 1298 (66.8%) had primary headaches. Among 1298 students with headache, 245 had migraine and 1053 had non-migraine headache, the prevalence rates being 12.6% and 54.2%, respectively. Female students with migraine and non-migraine headaches were comparable regarding age ( $\approx 22$  years), onset of migraine or onset of non-migraine headaches [6].

Some lifestyle characteristics of migraineurs and students with non-migraine primary headache are presented in Table 1. The average number of meals per day was similar

**Table 1** Some lifestyle habits of female students with migraine and non-migraine primary headaches

Characteristic	Migraine n (%)	Non-migraine headaches, n (%)	<i>p</i> value <sup>a</sup>
Average number of meals per day			
<3	73 (29.8)	261 (25.5)	0.3894
3	135 (55.1)	602 (58.7)	
>3	37 (15.1)	162 (15.8)	
Missed meals, frequency per month:			
0	36 (14.7)	533 (50.6)	<0.001
1–9	93 (38.0)	320 (30.4)	
10–20	99 (40.4)	165 (15.7)	
>20	17 (6.9)	35 (3.3)	
Average duration of sleep, h			
$\leq 6$	49 (20.0)	137 (13.4)	0.0087
7–8	167 (68.2)	704 (69.2)	
$\geq 9$	29 (11.8)	177 (17.4)	
Sleep duration less than usual, frequency per month			
0	62 (25.3)	386 (36.6)	0.0012
1–5	83 (33.9)	336 (31.9)	
6–10	72 (29.4)	263 (25.0)	
>10	28 (11.4)	68 (6.5)	
Sleep duration more than usual, frequency per month			
0	107 (43.7)	542 (51.5)	0.0456
1–5	95 (38.8)	376 (35.7)	
>5	43 (17.5)	135 (12.8)	
Smoking habit, actual or previous	113 (46.1)	422 (40.1)	0.0833
Cigarettes smoked, n/day			
<10	26 (23.0)	165 (39.1)	0.0015
$\geq 10$	87 (77.0)	257 (60.9)	

<sup>a</sup>According to chi square test

in the groups, but missing a meal was more frequently reported by migraineurs ( $p < 0.05$ ). A significantly greater percentage of students with migraine than those with non-migraine primary headache reported shorter duration of usual sleep (less than 6 hours per day), and the opposite was true for duration of usual sleep  $\geq 9$  hours per day ( $p = 0.0087$ ). Significant differences between these two groups were also found for changes in sleeping pattern. Migraineurs more frequently reported both shorter and longer sleep durations than usual ( $p = 0.0012$  and  $p = 0.0456$ , respectively). The percent of ever-smokers was a bit higher among migraineurs than among students with non-migraine primary headache ( $p = 0.0833$ ), and migraineurs smoked a greater number of cigarettes per day ( $p = 0.0015$ ).

All variables that according to  $\chi^2$  test were related to migraine at a significance level of  $p \leq 0.10$  were put in a model of multivariate logistic regression analysis. According to

multivariate analysis, the following factors were significantly associated with migraine: irregular eating (odds ratio (OR)=1.99; 95% confidence interval (95% CI), 1.69 to 2.34;  $p<0.001$ ), sleep duration shorter than usual (OR=1.18; 95% CI=1.00 to 1.38;  $p=0.0449$ ) and smoking >10 cigarettes per day (OR=1.18; 95% CI=1.00 to 1.39;  $p=0.0433$ ).

## Discussion

Migraine headache is considered to be a result of the inability of the nervous system to adapt to changes in the endogenous and exogenous environments. The changes could be hormonal, behavioural, dietary and environmental [9].

Many studies (e.g. patient surveys, randomized controlled and prospective diary studies) have been designed in order to answer the question "What triggers a migraine headache?" Taking into account that a reliance on self-reporting is subject to significant recall bias and that it generally leads to over-reporting of a given risk factor, in the present study we decided not to ask our participants questions about factors which they associated with the development of headache, but to ask questions about some of their lifestyle habits. These questions were located at the end of the questionnaire, unrelated to questions about headaches.

In the present study, missing a meal, changes in sleeping pattern (shorter than usual) and smoking >10 cigarettes per day were significantly related to migraine. According to the literature, all these factors have been considered as migraine precipitants [5, 9, 10].

Fasting and sleep disturbances have been shown to be general headache triggers acting on a central basis [9–14]. Their role as migraine precipitants has been considered as probable and possible [9]. Fasting was reported as a trigger by 40%–50% of migraineurs [14, 15]. Both undersleeping and oversleeping were described as triggers of migraine [11, 13]. Sleep disturbances as migraine precipitants were found

in 31%–50% of migraineurs [14, 15]. Shorter sleep duration and some other sleep disturbances were reported to be more frequent among children and adolescents with migraine and tension-type headache than among controls [16]. Sleep disturbances could alter neuronal firing rates within migraine-specific brainstem modulatory pathways, which could lead to migraine headache [4, 9, 10]. Sleep may itself play a role in the resolution of migraine attack [9].

Data about smoking as a precipitant of migraine are inconsistent [9, 13, 14, 16, 17]. In the present study, students with migraine were ever-smokers more frequently than students with non-migraine primary headache, but the difference was not significant. However, a significantly higher proportion of migraineurs smoked more than 10 cigarettes per day. Only a few students in both groups were heavy smokers (>25 cigarettes per day). Some epidemiological data suggest that smoking may influence the pattern of headaches in migraineurs [9]. A higher severity of headaches among smokers than among non-smokers has been reported, but the data are still insufficient to prove a causal link between cigarette smoking and a worsening of migraine [9].

On the basis of the results obtained, it is not possible to conclude that irregular eating, sleep duration shorter than usual and smoking >10 cigarettes per day act as triggers of migraine attacks. All these life characteristics could be symptoms of the migraine prodrome or could even be consequences of migraine (one cannot eat because of headache, cannot sleep or sleeps longer or shorter than usual or smokes because of headache). It is also possible that the results were influenced by some confounding variables not taken into account in this study. Nevertheless, the results of the present study are in line with some other investigations suggesting that some lifestyle habits probably play a role as migraine precipitants.

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