

Food and migraine in adolescents

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Abstract

Background Migraine headaches are a common problem worldwide, especially in adolescents. They are usually chronic, with frequent relapses. Therefore, any dietary risk factor for headaches has important implications on migraineurs. However, the association between migraine and diet needs to be examined further.

Objective To investigate the association between diet and migraine in adolescents.

Methods We conducted a cross-sectional study in August to September 2009 on 13 - 18 year old adolescents in a senior high school in Medan, North Sumatera. We included subjects diagnosed with migraine, according to the International Headache Society (IHS) criteria. Ninety participants completed the questionnaire. Foods we observed for a link to migraine included milk, chocolate, ice cream, cheese, bread, instant noodles, meatballs, chili sauce, sweetener, yoghurt, pizza, and other foods and beverages.

Results Of the 90 participants with migraines, there were more females (61.1%) than males. There were statistically significant associations between migraine and triggering foods ($P = 0.045$, 95% CI 0.59 to 0.79) as well as between migraine and family history of migraine ($P = 0.043$, 95% CI 0.46 to 0.66). Stress ($P = 0.164$), menstruation ($P = 0.369$), and sound or light ($P = 0.577$) had no significant association with migraine. A wide variety of foods and beverages were implicated as migraine precipitants. The most common were chili sauce (75.8%), ice cream (71.0%), milk (67.7%), instant noodles (67.7%), chocolate (61.3%), peanuts (59.7%), cheese (54.8%) and meatballs (54.8%).

Conclusion Food and family history have a significant association with the occurrence of migraine in adolescents. [Paediatr Indones. 2011;51:223-6].

Keywords: migraine, food trigger; adolescents

Migraine is a common problem often occurring in adolescents.¹ Migraine may affect daily activities, personality, intelligence, interpersonal relationships, as well as adolescents' school activity.²⁻⁴ It is estimated that such headaches occur in 75% of adolescents, while only 25% of younger children are affected.⁴ Drug treatment for acute migraine is often unsatisfactory, and long-term medications for migraine prophylaxis can be counterproductive and potentially toxic. The documentation and avoidance of factors that act as migraine triggers in predisposed patients may provide a more effective approach to the management of migraine.²

A London study showed that after an intervention for 1 to 2 months with foods that induce migraine, 30% to 40% of the subjects no longer had migraines triggered by these foods.⁵ Another study showed that 7% to 44% of certain types of food induced migraines. However, controversy remains on whether food induces migraine. Nonetheless, avoidance of enticing foods

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is rarely favoured by adolescents. A better approach would be to reconsider the menu of food that induces migraine.⁶ It is not surprising that attention to diet as a possible cause of migraine headaches is frequently neglected in favor of treatment with medications. However, it is important to gain a better understanding of the potential role of diet in the cause of migraine, and to emphasize the importance of excluding dietary and other migraine triggers before initiating long term drug therapy.² This study was designed to investigate the association between dietary factors and migraines among adolescents with migraines.

Methods

We conducted a cross-sectional study from August to September 2009 in 13 to 18 year old adolescents in a senior high school in Medan, North Sumatera. Participants were diagnosed with migraine according to the International Headache Society (IHS) criteria. Informed consent from subjects and their parents was obtained. We excluded patients with daily headaches, respiratory infections, sinusitis, nasal polyps, chronic otitis media, epilepsy and previous head trauma.

Data was collected by interviews and questionnaires. A pediatric neurologist performed physical and neurological examinations on patients diagnosed with migraine. Participants were instructed on filling the questionnaire on foods thought to induce migraine. Data from the questionnaire were collected, analyzed and presented using SPSS for Windows 15.0 and Microsoft Excel 2003. We used Chi square test to analyze the association between food and migraine. Level of confidence was set as $P < 0.05$ with a 95% confidence interval (CI).

Results

We screened 200 adolescents and found 150 with frequent headaches. Of these, 100 suffered from migraine based on the IHS criteria. We excluded 10 participants because they refused to participate in this study (5), suffered from sinusitis (1) or had respiratory infections (4). All subjects filled questionnaires on their intake of potential migraine-inducing foods.

Table 1 shows the age group with the most

migraine attacks was in the age range of 13 to 13.9 years, with 35 subjects (38.8%). The group with the lowest number of subjects was aged ≥ 15 years, with only 2 patients (2.2%). There were more females than males in our study (61.1% vs 38.9%). Mean body weight of subjects was 38.5 kg and mean height was 153.4 cm.

Table 2 shows foods that may induce migraine. The most common foods that induced migraine were chili sauces (75.8%), ice-cream (71.0%), milk (67.7%), instant noodles (67.7%), and chocolate (61.3%).

Table 3 shows a significant association between migraine and food consumption (68.9% vs 31.1%; $P = 0.045$). Migraine was also significantly associated with family history of migraine (55.6% vs 44.4%; $P = 0.043$). Other possible causes of migraine including stress, menstruation and light or sound, but these were not statistically significant.

Table 1. Demographic data of participants

Characteristics	Total = 90
Age, years, n (%)	
12 – 12.9	29 (32.2)
13 – 13.9	35 (38.8)
14 – 14.9	24 (26.7)
≥ 15	2 (2.2)
Gender, n (%)	
Female	55 (61.1)
Male	35 (38.9)
Mean weight, kg (SD)	38.5 (6.86)
Mean body height, cm (SD)	153.4 (8.98)

Table 2. Foods that may trigger migraines

Food	Total=62	
	Yes (%)	No (%)
Chili Sauce	47 (75.8)	15 (24.2)
Ice cream	44 (71.0)	18 (29.0)
Milk	42 (67.7)	20 (32.3)
Instant noodles	42 (67.7)	20 (32.2)
Chocolate	38 (61.3)	24 (38.7)
Peanuts	37 (59.7)	25 (40.3)
Seafood	36 (58.0)	26 (41.9)
Soft drinks	34 (54.8)	28 (45.2)
Meatballs	34 (54.8)	28 (45.2)
Cheese	34 (54.8)	28 (45.2)
Pizza	34 (54.8)	28 (45.2)
Yoghurt	34 (54.8)	28 (45.2)
Cola	33 (53.2)	29 (46.8)
Doughnut	33 (53.2)	29 (46.8)
Grapes	32 (51.6)	30 (48.4)
Snack	31 (50.0)	31 (50.0)
Mutton	30 (48.4)	32 (51.6)
Sausage	30 (48.4)	32 (51.6)
Flavoring	30 (48.4)	32 (51.6)
Sweetener	27 (43.5)	35 (56.5)

Table 3. Possible factors triggering migraine

Factors	Total=62		95% CI	P
	Yes (%)	No (%)		
Food	62 (68.9)	28 (31.1)	0.59 to 0.79	0.045
Family history	50 (55.6)	40 (44.4)	0.46 to 0.66	0.043
Stress	19 (21.1)	71 (18.9)	0.13 to 0.29	0.164
Menstruation	17 (30.9)	38 (69.1)	0.19 to 0.43	0.369
Sound or light	36 (40)	54 (60)	0.30 to 0.50	0.577

Discussion

We found the peak age of migraine in adolescents to be 13 to 13.9 years. The prevalence for migraine in females was 1.5 times that of male adolescents. A migraine screen among students reported the prevalence to be higher in females at the age of 15 years (8% to 23%), with no gender predominance at the age of 7 to 11 years. But male predominance was noted in 3 to 7 year age group.⁶ Similarly, another study found the prevalence of migraine in female teenagers to be 3 times higher than in males.⁷ These results may be influenced by fluctuating hormones during puberty.⁸

However, we found that menstruation was not a migraine trigger, in contrast to a previous study that found of women with migraines, 60% of cases were related to menstruation.⁹⁻¹¹ According to a study in Brazil, premenstrual hormones triggered migraines in 53% of 200 patients.¹² Another study stated that female hormones played a major role in triggering migraine during both premenstruation (26%) and menstruation (24.5%).

We found that neither stress nor environmental factors were migraine triggers, in contrast with other studies, which found stress in adolescents to be the most common migraine trigger. Stress in childhood and adolescence may be due to family conflicts, anxiety, peer teasing, frequent nagging and school problems.¹³⁻¹⁵

An Austrian study stated that common migraine triggers were climate or environmental factors (82.5%), stress (66.7%) and stress followed by relaxation (50%). These common causes were generally not permanent.¹⁵ A Brazilian study concluded that significant migraine triggers were environmental factors (68%) and stress (65%).¹² A London study found that among five common migraine triggers including diet, alcohol, stress, fatigue and environment

(visual trigger), environment-related visual stimuli was most significantly correlated to migraines.¹⁶

We found family history of migraine to be significantly associated to migraines in our subjects. An American study on migraine triggers concluded there was a significant association in migraine patients with a family history ranging from 67% to 100%.¹⁷ Hormonal and genetic factors also play a role in triggering migraines.¹²

We found dietary factors to be significantly associated with migraines in adolescents. Patients with migraine were encouraged to keep a daily record of food consumed, before a migraine attack. From the record, a migraine patient may notice trends in foods consumed before migraine onset, which may be a triggering factor. Subsequent avoidance of those foods may decrease migraine frequency. An estimated 20% of migraine patients are sensitive to certain kinds of food. Foods containing vasoactive amines, such as tyramine and phenylalanine can trigger migraines.¹¹

A clinical double-blind, randomized, cross-over trial in Turkey found a statistically significant reduction in the number of migraine attacks when dietary restriction was implemented. They found this to be an effective strategy in reducing the frequency of migraine attacks.¹⁸ However, the relationship between food and migraine remains controversial. Foods triggering migraines may be identified in 10 - 30% of adolescent migraine patients. Offering patients traditional or modern food lists associated with migraine triggers may be helpful for reducing migraine frequency. Patients should be advised to mark the lists associated with their migraine triggers on a regular basis, as part of lifestyle management of migraine.¹⁵ Another study reported that if migraine-associated food is not avoided, patients will suffer more severe migraine attacks.^{15,19}

The most common food triggers of migraine found in our study were chili sauces, ice cream, milk,

instant noodles, and chocolate. Similarly, Marcus *et al.* found that chocolate was a migraine trigger, along with other vasoactive amine-containing foods.²⁰ Foods often consumed by adolescents that may trigger migraine are cheese, red wine, beer, chocolate, yoghurt, milk products, coffee, tea, Coke, artificial sweeteners, and fast food. Additional food seasonings, such as monosodium glutamate, aspartame, and sodium nitrates are also thought to be migraine triggers.^{21,22}

Other studies found that avoiding food-associated migraine triggers caused patients to be migraine-free during the abstinence period. Food-associated migraine triggers included wheat (78%), oranges (65%), eggs (45%), tea (40%), coffee (40%), chocolate (37%), milk (37%), beef (35%), corn (33%), sugar cane (33%), yeast (33%), mushrooms (30%), and beans (28%).¹⁹ According to a study in Israel on caffeine consumption, after a period of caffeine abstinence, 33 out of 36 patients were migraine-free.¹⁵ Further study is needed to compare pharmacological therapy for prevention of migraine attacks to non-pharmacological therapy, such as avoiding factors that induce migraines.

In conclusion, we found migraines in adolescents to be associated with both family history of migraines and food. The most common food triggers of migraine were chili sauces, ice cream, milk, instant noodles and chocolate.

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