Food intake before migraine attacks in children

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SUMMARY. A questionnaire survey of 120 children with migraine showed an average age of onset of 5·15 years, an equal sex ratio under nine years, and a positive family history in 79 per cent. Eye symptoms (42 per cent) and headaches (32 per cent) heralded an attack, with abdominal pain and vomiting later and less frequent. Visual aura was not recognized under five years, but occurred in 52 per cent of the 13 to 15 year age group. Most attacks occurred on schooldays and 82 per cent were over within two days.

The 24-hour food intake before an attack was compared with the food intake seven days later when no migraine occurred. This suggested that fasting (41 per cent) or specific foods (38 per cent) could have been responsible for many of the attacks.

Introduction

MIGRAINE in children is a neglected diagnosis with little space devoted to it in paediatric textbooks, yet 20 per cent of adults claim their migraine began before the age of 10 years. It has been estimated that there are three million adult sufferers, which suggests that there are 750,000 children under 10 years in Britain suffering from migraine. Recent work has suggested that food sensitivity or fasting may be a precipitating factor. This study was designed to clarify the characteristics of migraine in children and to study the food intake before an attack and during a control period seven days later.

Method

Volunteers for the study were sought through national and local radio stations, *Parents* and *Woman* magazines, and through general practitioners and paediatricians, particularly those involved in the Migraine in Children Workshop. Questionnaires were distributed, which were in three parts:

1. *Registration form.* Completed on behalf of children suffering from migraine, giving general information on age, sex, frequency of attacks, and family history.

2. *Attack form.* Completed immediately after the child had a migraine attack, giving an account of the attack and details of all food (including sweets and chocolates) and drinks that had been consumed during the 24 hours before the onset of an attack, and the times at which they were consumed.

3. *Control form.* Completed seven days later, giving an account of all food (including sweets and chocolates) and drinks and the times at which they were consumed during the previous 24 hours. Thus each child acted as its own control as far as dietary factors were concerned. Control forms were analysed only if the child was free from migraine seven days later. The interval of seven days was chosen so that any recurring factor on a particular day of the week, for example, in Jewish households, would be the same.

Data were analysed for children under 15 years, with migraine, who satisfied the criteria of Vahlquist and Hackzell (1949) and Bille (1962), that is, the presence of recurrent paroxysmal headaches separated by symptom free intervals and at least two of the following four features: unilateral pain, nausea and/or vomiting, visual aura, and a family history (parents or siblings).

When analysing the data in respect of the dietary factors, the criteria adopted were those used by Dalton (1975) in the analysis of food intake during the 24 hours before a spontaneous attack of migraine. Dietary fac-

Table 1. Age distribution of sample.

	Boys	Girls	Total
1 to 2 years	—	1	1
3 to 4 years	1	2	3
5 to 6 years	8	9	17
7 to 8 years	8	7	15
9 to 10 years	11	13	24
11 to 12 years	15	18	33
13 to 14 years	9	15	24
15 to 16 years	—	3	3
Total	52	68	120

Table 2. Percentage incidence of a family history.

Present *79*	Absent *18*	Child adopted *2*	
Relatives listed			
Mother	48	Father	28
Grandmother	35	Grandfather	15
Great grandmother	3	Brother	10
Sister	15	Uncle	14
Aunt	15	Cousin	17
Total	116		84

tors included the consumption of specific foods and fasting. A factor was considered positive if present during the 24 hours immediately preceding the onset of migraine, as shown on the attack form, but absent from the control form seven days later. Specific foods were cheese, chocolate, and citrus fruits, present on the attack form but absent from the control form. Citrus fruits included oranges, lemons, and grapefruit, but excluded drinks such as squash, or foods such as orange jelly which might or might not contain citrus fruit. Fasting was defined as the absence of food for five hours during the day or 13 hours overnight, and only considered as a positive factor if present on the attack form but absent from the control form.

Results

Questionnaires were received from all parts of Britain and, after exclusions, complete data were available for 120 children suffering from migraine; 96 children completed the attack form immediately after an attack and 77 children completed both attack and control forms.

Under the age of 10 years there were 28 boys and 30 girls, but the incidence of girls increased after 10 years of age (Table 1). The mean age of onset by probit analysis was $4 \cdot 29 \pm 0 \cdot 018$ years for boys, $5 \cdot 76 \pm 0 \cdot 033$ years for girls, and $5 \cdot 15 \pm 0 \cdot 026$ years for the whole sample. Migraine was first diagnosed by the general practitioner in 44 per cent of children, by a parent in 40 per cent, in hospital in 10 per cent, by one school doctor, and by school nurses, of whom some listed more than one. A family history was present in 79 per cent of children, while two per cent had been adopted. Table 2 shows the relatives who had suffered from migraine; as expected more females were named than males. Attacks averaged once a week in 22 per cent of the children, once a month in 33 per cent, once in three months in 26 per cent, and less often in the remaining children. Only 25 per cent of the children suffered from travel sickness.

Details of the specific attack, shown in Table 3, revealed that most attacks lasted between three and eight hours, and it was rare for an attack to last longer than two days. Contrary to popular belief, the attacks were more frequent on schooldays, even allowing for the fact that children spend more days at school than at home.

The children were asked to draw what they saw during an attack and many examples of the typical visual aura were drawn, sometimes in colour. One child drew a 'Big Me' becoming smaller and smaller, a typical Alice in Wonderland phenomenon. Visual auras were not experienced by the four children under five years, and were commonest among the 13 to 15 years age group. No-one with hemiplegic or ophthalmoplegic migraine completed questionnaires.

Eye symptoms and headaches heralded an attack, and most pain during an attack was exerienced in the eyes or

Table 3. Timing of specific attacks (percentage figures).

Duration	
Under 2 hours	*15*
3 to 8 hours	*18*
9 to 12 hours	*18*
13 to 24 hours	*9*
1 to 2 days	*18*
Longer than 2 days	*12*
Too vague to assess	*6*
Time of onset	
On waking	*21*
8.00 am to 12.00 noon	*18*
1.00 pm to 4.00 pm	*23*
5.00 pm to 8.00 pm	*29*
Overnight	*9*
Monday	*14*
Tuesday	*9*
Wednesday	*16*
Thursday	*19*
Friday	*24*
Saturday	*9*
Sunday	*8*
Schoolday	*59*
Weekend	*17*
Holiday	*23*
What starts an attack?	
Stress (tension, fear, worry)	*26*
Specific food	*13*
Hunger	*1*

head, whilst abdominal pain was considerably less frequent (Table 4). The medicaments taken in the hope of obtaining relief were numerous, varied, and often multiple. For example, prochlorperazine (Stemetil) was taken by five children, clonidine (Dixarit) by four children, 'Migril' by three, 'Sanomigran', paracetamol, 'Migraleve', phenytoin (Epanutin), aspirin, phenobarbitone, and propranolol (Inderal) by two, and penicillin, amitriptyline (Tryptizol), imipramine (Tofranil), metoclopramide (Maxolon), 'Codis', 'Vallergan', 'Cafergot' suppositories, 'Calpol', and ergotamine each by one child, while no medication was taken by 70 (58 per cent) of the children.

Positive dietary factors, which might have been responsible for triggering an attack, were present in 70 per cent, with specific foods in 38 per cent and fasting in 41 per cent of the 77 children who completed both attack and control forms.

Table 4. Characteristics of specific attack in 96 children.

How do you know an attack is starting?* (percentages in brackets)				
Eye symptoms	48	*(42)*		
Headache	37	*(32)*		
Pallor	9			
Vertigo	8		Vomiting	6
Abdominal pain	5		Tiredness	5
Cold	4		Weakness	4
Yawning	3		Irritability	2
Hot	2		Excitement	2
Speech difficulties	2		Nausea	2
Hunger	1		Sweating	1
Swollen face	1		Sore throat	1
Nausea or vomiting (percentage occurrence)				
Present *64*	Absent *19*		Occasionally	*17*
Hunger (percentage occurrence)				
Present *24*	Absent *71*		Occasionally	*5*
Visual aura (percentage occurrence)				
Under 4 years	—			
5 to 8 years	*25*			
9 to 12 years	*33*			
13 to 15 years	*52*			
Total	38			
Site of most pain during an attack* (percentages in brackets)				
Eyes	54	*(47)*		
Head	53	*(46)*		
Abdomen	14	*(12)*		
Side of face	13	*(11)*		
Neck	2			
Arms	1			
Legs	1			
Not known	2			

*Some listed more than one.

Discussion

There is a marked similarity in these findings with those of the Uppsala series of children reported by Bille (1962) in which there was a steady increase in incidence of girls, compared with boys, after the age of nine years. Bille found the age of onset in the seven-year-olds to be 4·8 years, compared with 5·15 years in this survey of children under 15 years. Prensky (1976) analysed data from eight published surveys of migraine in children and found a positive family history of 72 per cent (range 44 to 87 per cent) which compares with a figure of 79 per cent in this survey. In Prensky's analysis, nausea and/or vomiting occurred in 70 to 100 per cent compared with only 64 per cent in our survey, and visual aura in 10 to 15 per cent compared with 32 per cent in our survey.

The findings of this questionnaire survey appear to correspond well with the other surveys of migraine in children. However, this survey is unique in that it included data on food intake during the 24 hours before a spontaneous attack and also control data on food intake seven days later when the child was free from migraine. Recent work has shown a biochemical defect in migraine sufferers with a highly significant reduction in the ability of migraine patients to oxidize both tyramine and phenylethylamine when compared with non-migrainous controls. Measurements of monoamine oxidase activity in platelets of migraine sufferers showed no difference between those with dietary and non-dietary migraine (Sandler *et al.*, 1974). A study of food intake over the 24 hours before 2,313 spontaneous migraine attacks in women revealed that fasting had occurred in 67 per cent and specific foods (which also included alcohol) had been consumed in 74 per cent (Dalton, 1975), but that study did not analyse control food intake seven days later.

The selection of five hours as the interval between eating in the daytime and 13 hours overnight as the definition of 'fasting' was purely arbitrary, having been the time interval defined in the adult study. It is likely, however, that in children a shorter gap may act as a trigger, particularly if vigorous exercise is undertaken in the interval. We suggest that in cases where migraine follows fasting the blood sugar level drops too low, but there is a spontaneous release of adrenaline and catecholamines which raise the blood sugar and at the same time cause vasodilation of the cerebral vessels resulting in the attack of migraine. Thus an estimation of blood sugar during or after an attack is of little value as the result will still be within normal limits; nor will the administration of food or sugar help once an attack is already under way.

We appreciate that in this survey only the three common specific foods (cheese, chocolate, and citrus fruits) were sought, but there are many other foods to which some individuals are sensitive, such as pork, alcohol, onions, and fatty foods. Failure to identify a specific food does not necessarily imply a non-dietary basis for migraine.

Table 5. Dietary factors on attack days and control days in 77 children (percentages in brackets).

	Attack days	Control days	Positive
Fasting	51	20	31 *(41)*
Cheese	28	16	12 *(16)*
Chocolate	26	13	13 *(17)*
Citrus fruits	7	3	4 *(5)*
No dietary factors			23 *(30)*

Conclusion

This study confirms the importance of considering the food intake during the 24 hours immediately before a migraine attack in a child. The prophylactic approach to treatment should include taking particulars of food intake before attacks and, if the findings of specific foods or fasting are confirmed, the parents, and later the child, should be told of the importance of the elimination of dietary factors. We estimate that such simple and cheap treatment could relieve the sufferings of half a million young children under 10 years of age in Britain today.

References

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Addendum

Our thanks are due to the British Migraine Association for their financial support, to our colleagues at the Migraine in Childhood Workshops for their constructive criticisms, and to those who distributed and completed the questionnaires.

Putting children first

The views of those using the services should be sought so that these can become more responsive to patients' needs. The committee [The Children's Committee] (though recommending that most deliveries should be concentrated in consultant units) even calls for a randomized controlled trial of home delivery because "the risks of domiciliary might have been overemphasized by professionals for safety reasons and by administrators for economic ones".

Reference

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