Journal of Nutritional & Environmental Medicine (2001) 11, 23–32

CLINICAL RESEARCH

Purines, Alcohol and Boron in the Diets of People with Chronic Digestive Problems

MARGARET MOSS MA UCTD DipION

11 Mauldeth Close, Heaton Mersey, Stockport, Cheshire SK4 3NP, UK

Abstract

Purpose: *To determine whether there is a significant relationship between the consumption of alcohol, purines and boron, and the incidence of irritable bowel syndrome or frequent diarrhoea.*

Design: *Statistical survey of diets.*

Materials and Methods: *120 individuals, seeking help with chronic health problems, were assessed for their intake of purines, alcohol and boron, which are dietary items that use body stores of vitamin B2 and molybdenum. They stated whether they had irritable bowel syndrome (IBS) or frequent diarrhoea. The proportions with different types of diet who had symptoms were compared. The group was extended to 578 individuals, and the calculations repeated, both for the whole group, and for males and females separately. Statistical significance was assessed, using a chi-squared test.*

Results: *In all three groups, those with higher intakes of alcohol, purines and boron had a higher prevalence of IBS or frequent diarrhoea. The relationship was found to be significant.*

Conclusions: *Reducing alcohol, purines and boron in the diet of patients with IBS or chronic diarrhoea may be a cost-effective treatment. A randomized study would be helpful to assess the results of such an intervention.*

Keywords: irritable bowel syndrome, diarrhoea, purines, alcohol, boron, molybdenum, riboflavin, vitamin B2, sulphate, detoxification.

INTRODUCTION

We all breathe in, eat, drink and touch poisons. We expel some, and store others. The rest we alter through chemical reactions, which usually make them less toxic, but sometimes more so. If they are still toxic, we then expel or store them. Failure to detoxify efficiently may result in irritation along the routes of expulsion.

Dietary and environmental toxins can be expelled by exhalation or sweating, or in urine, faeces or vomit. It is important not to block their routes of expulsion by symptom-suppressing drugs.

The detoxification pathways of the body may be inadequate in various ways [1]. Poor sulphate conjugation has been implicated in food sensitivity [2]. Poor sulphate conjugation may be caused by:

(1) failure to convert enough of the amino acid cysteine to sulphite, using cysteine dioxygenase,

ISSN 1359-0847 print/ISSN 1364-6907 online/01/010023-10
DOI: 10.1080/13590840020030230

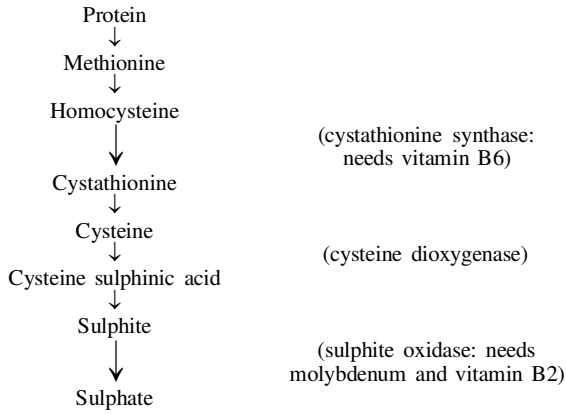

FIG. 1. The production of sulphate from dietary protein and protein catabolism.

(2) failure to convert sulphite to sulphate, using sulphite oxidase (this process requires molybdenum and vitamin B2),
(3) poor activity of the sulphotransferase enzymes, phenolsulphotransferase M (MST) and phenolsulphotransferase P (PST), which conjugate amines and phenols, respectively.

Conjugating with glucuronide is another mechanism for detoxification. Unfortunately, the conjugates may be reactivated, by beta-glucuronidase, which removes the glucuronide [3]. Calcium glucarate, which is found in high concentrations in oranges, plays a useful role in inhibiting beta-glucuronidase [4].

Another important pathway is the conversion of toxins into alcohols. These are then made more toxic, by converting them into aldehydes, which themselves then need to be detoxified. Zinc and vitamin B3 are involved in the conversion from alcohol to aldehyde, using alcohol dehydrogenase [5]. Aldehyde dehydrogenase and aldehyde oxidase deal with the resulting aldehyde. The latter requires molybdenum and vitamin B2 [6].

toxin
↓
alcohol
↓ (involves zinc and B3)
aldehyde
↓ (involves molybdenum and B2)
acid

It will be seen from this that, if large quantities of zinc and vitamin B3 are given, with little vitamin B2 and no molybdenum, a build-up of harmful aldehydes may occur. Few multiple vitamin–mineral supplements provide much molybdenum or vitamin B2.

Vitamin B2 is also required to recycle glutathione, using the enzyme glutathione reductase. Glutathione detoxifies fungicides, herbicides, nitrosamines, solvents, plastics, steroids, pesticides, vehicle exhaust fumes, cigarette smoke, bacterial toxins, lead, mercury, and many drugs [7].

Some foods, like red meats, oily fishes and yeast, contain large amounts of purines in their genetic material. These require processing with xanthine dehydrogenase, which also uses molybdenum and vitamin B2, diverting them from making sulphate or detoxifying aldehydes. Caffeine provides extra work for xanthine dehydrogenase [6]. Alcohol is partly detoxified by aldehyde oxidase, which uses the same nutrients.

Other foods, for example tomatoes, peppers, apples, pears, peaches, plums, grapes, soya, parsnips, rosehips, hazelnuts, peanuts and almonds, contain a toxic mineral, boron [8–10]. Confusion about the boron content of foods has been caused by fruits and vegetables being grouped together, and called vegetables [11]. Boron binds to vitamin B2, so that it is excreted, and no longer available for detoxification [12]. Traditionally, eating too many of certain fruits was believed to cause diarrhoea. This may be why. It has been suggested that a small amount of boron may perhaps be needed by the body, and people living on junk food may be short of it [13]. However, people eating healthy food will obtain boron through many items in the diet.

A very small study has suggested that boron may help patients with osteoarthritis, but 3 of the 10 patients on boron dropped out, apparently because of "intercurrent medical problems" or "significant worsening of condition". It would be interesting to know whether boron toxicity contributed to these problems [14]. It is possible that, if boron helps in certain conditions, it is acting as a drug, with side effects, rather than as a nutrient. It may be wise to accompany research on possible therapeutic uses of boron by functional tests of vitamin B2 activity. Clinical trials need to be long enough, to ensure that prolonged use of boron is safe. It may be safe for some people, but not for others. It may be safe only for those with low boron diets, or only for those with efficient digestive and detoxification systems.

Since purines and alcohol are processed using molybdenum and vitamin B2, and vitamin B2 is depleted by boron, it is possible that oxidation by sulphite oxidase, detoxification by aldehyde oxidase, and glutathione and sulphate conjugation may be adversely affected by diet. Because of the stress they put on these detoxifying pathways, it is reasonable to suspect that diets high in purines, alcohol and boron may increase the toxicity of the gut contents, and so play a part in the development of irritable bowel syndrome (IBS).

The aim of this study was to find out whether there was a statistical relationship between IBS and the consumption of foods high in purines, alcohol or boron.

MATERIALS AND METHODS

One hundred and twenty consecutive individuals who came to a nutrition clinic, from April 1994 to April 1995, were asked to fill in questionnaires. Parents filled in questionnaires for children, and occasionally adults asked for help in filling in their own forms. Among other questions, they were asked about their consumption of purines, alcohol and boron. They also gave information about their symptoms, which were usually chronic, and varied from mild to severely disabling. The clinic is a general nutritional clinic, and patients arrive with a variety of complaints, for example, arthritis, fatigue, digestive problems, depression, and frequent infections. The clinic sees people of all ages. More females attend than males.

The proportion of people with high alcohol or purine diets, and with high boron diets, who also complained of IBS or frequent diarrhoea, were calculated. In some cases, a doctor had described the condition as IBS, after whatever tests he or she considered appropriate. In other cases, patients were simply recording that they frequently had diarrhoea. In most cases, digestive symptoms were not the only complaints, and they were not always the main ones. Clients whose only digestive complaint was constipation were not included, as this was likely to stem from other causes, including lack of dietary fibre.

The questions answered by the patients are shown in Table 1. A clinic questionnaire tends to evolve with time, as it exists primarily to elicit useful information for considering the patient's problems, rather than for research. The full questionnaire can be found in Appendix 1. The questions are deliberately mixed, as otherwise patients are likely to be influenced by their understanding of what the questioner wishes to know.

The quantities of boron in the diet cannot be calculated exactly, as research on boron levels in foods has been limited. Even where foods have been analyzed, the contents may vary from one batch to another. For example, Finnish research gives a range of 1 to 6 mg

TABLE 1. Questions answered by individuals completing the clinic questionnaire

1. Anyone responding positively to any of these questions was counted as having a higher boron diet:
Do you eat a lot of tomatoes, peppers, peaches, apples or apricots?
Do you eat a lot of tomatoes, peppers, apricots, peaches or apples?
Do you eat a lot of tomatoes, peppers, peaches, apples or pears?
Do you often drink apple or tomato juice?
Do you often drink a lot of apple or tomato juice?
2. Anyone responding positively to either of these questions was counted as having a higher alcohol diet:
Do you drink more than a glass of alcohol a day?
Do you drink more than a glass of alcohol a day on average?
3. Anyone responding positively to either of these questions was counted as having a higher purine diet:
Do you eat much red meat, yeast or oily fish?
Do you eat a lot of red meat or oily fish?

kg^{-1} boron for apples. Nielsen gives these values for $\mu g\ g^{-1}$ (dry weight): apple 465, pear 709, tomato 1258 and red pepper 440 [13]. The Finns give as values for mg kg^{-1} wet weight imported apple 4.4, peach 6.2 and canned apricot 3.4 [8]. It is necessary to look at not only the concentration in foods, but also the quantities commonly eaten. For example, large quantities of apples and tomatoes can be consumed in juices and purees, whereas only small quantities of nettle, at 6.5 mg kg^{-1}, are eaten in the UK.

High purine foods commonly eaten are meats, herring, mackerel, sardines and yeast. Mussels, roe, scallops, and spices are eaten in smaller quantities.

Where patients have been unsure whether their diets are high or low in boron, alcohol or purines, the answer has usually been clarified, by examining their two-day diet sheets. These sheets are designed for the purpose of advising the client, and not for research. Clients are asked to fill in two typical days' diet. Often they will fill in the form over two days, recording what they consume at the time. However, others will prefer to give two contrasting days, perhaps weekend and weekday, or a healthy and an unhealthy day. Occasionally clients make an appointment at short notice, and fill in the form on arrival at the clinic.

It should be noted that a preliminary investigation is necessary, as to whether each presumed risk factor actually influences the proportion of sufferers. Otherwise an irrelevant factor may be included in the further investigation. Research has been published in the past, showing a statistically significant effect of a group of lifestyle changes, which leaves unanswered the question as to which of the changes actually mattered.

In order to investigate whether the relationship observed between purines, alcohol and boron consumption, on the one hand, and chronic digestive problems, on the other, might be statistically significant, it was necessary to collect data from a larger group of individuals. The group of clinic clients was enlarged to 472, taking consecutive clients up to June 1997, and others were asked to fill in forms. These were recruited by writing letters to *Allergy Newsletter* and *Gut Reaction*, and by asking audiences at meetings and other volunteers to complete forms. This gave a wider geographic spread of people, and increased the proportion who had digestive problems.

The proportions of this larger group with higher boron diets, and higher alcohol or purine intake, were again calculated.

Those clients who declared their occupation were grouped into similar occupations, and these are shown in Table 2.

The majority of the participants were female. To see if any conclusions about the whole group also applied to the group of 136 males, the proportions of the males and females with higher boron diets or higher alcohol or purine intake were calculated separately.

As well as looking at the boron intake together with the alcohol and purine intake, these were considered separately, to see if they were of significance in themselves.

TABLE 2. Occupation of individuals completing the clinic questionnaire

Occupations declared by clients	Females	Males
Health	19	3
Education/library/social work/trading standards	44	8
Carpenter/hairdresser/support worker/skip driver	9	14
Banking/insurance/secretary/travel agent/clerk	41	5
Manager/civil servant/computers/administration/law	51	17
Musician/writer/actor/artist/designer	10	2
Self-employed	4	2
Housework/parenting	43	1
Child	9	19
Student	19	7
Retired	31	11
On benefit	28	12

The number of people with 0, 1, 2 and 3 risk factors, from higher boron, alcohol or purine diets was calculated, and the proportion with chronic digestive problems found for each category.

A chi-squared test was used, with the Yates' correction, to compare the group with 0–1 risk factor with the group with 2–3 risk factors, in order to find out if the difference which these aspects of diet contribute is statistically significant.

RESULTS

Forty-eight people, or 40% of the original 120, complained of either frequent diarrhoea or irritable bowel syndrome.

These 120 people were in three overlapping sets:

B—those with higher boron intake,
AP—those with higher alcohol or purine intake,
and ID—those with IBS or frequent diarrhoea.

The results for the pilot group are shown in Table 3. It appears from these figures that both high purine or alcohol diets, and high boron diets increase the chance of developing IBS or frequent diarrhoea. Purine or alcohol seems a more powerful predictor than boron, although this may depend on the quantities involved. Eating high purine or alcohol and high boron diets appeared to double the risk of developing IBS or frequent diarrhoea in those coming to the clinic for help.

These preliminary figures suggested that it might be productive to investigate a larger set of people. The corresponding results for the larger group are also shown in Table 3. Higher alcohol or purine diets and higher boron diets were again associated with having IBS or frequent diarrhoea.

TABLE 3. The proportion of individuals having IBS or frequent diarrhoea: mixed males and females

Group	Proportion of individuals with ID
Pilot group	
Low AP and low B	14/48 = 29.2%
Low AP but high B	16/40 = 40.0%
High AP but low B	7/13 = 53.8%
High AP and high B	11/19 = 57.9%
Whole group	
Low AP and low B	63/167 = 37.7%
Low AP but high B	95/211 = 45.0%
High AP but low B	42/80 = 52.5%
High AP and high B	76/120 = 63.3%

TABLE 4. The incidence of digestive problems and the number of risk factors.

(A) People without digestive problems

No. of risk factors	No. of people
0	101
1	160
2	39
3	5

(B) People with digestive problems

No. of risk factors	No. of people
0	65
1	127
2	73
3	8

No. of risk factors	No. with problems	No. without problems	Total
2–3	81	44	125
0–1	192	261	453
	273	305	578

TABLE 5. The proportion having IBS or frequent diarrhoea: males and females separately

Males	
Low AP and low B	8/47 = 17.0%
Low AP but high B	18/47 = 38.3%
High AP but low B	10/25 = 40.0%
High AP and high B	8/17 = 47.1%
Females	
Low AP and low B	55/120 = 45.8%
Low AP but high B	77/164 = 47.0%
High AP but low B	32/55 = 58.2%
High AP and high B	68/103 = 66.0%

The larger proportions in the whole group, compared with the pilot group, are explained by the inclusion of the readers of the *Gut Reaction* newsletter, all of whom had digestive problems.

The results of investigating this larger group in terms of risk factors are shown in Table 4. When incidence of IBS or diarrhoea was investigated for statistical significance, chi-squared was 18.86 ($p < 0.001$).

The results for the males and females separately are shown in Table 5. Males and females with higher alcohol, purine or boron diets were both found to have higher proportions with IBS or frequent diarrhoea. The percentages for the females are higher than for the males, reflecting the greater proportion of females in the sample who had digestive problems.

All four sets of results show that:

the proportion on lower boron and lower alcohol and purine diets is less than
the proportion on higher boron and lower alcohol and purines, which is less than
the proportion on lower boron and higher alcohol and purines, which is less than
the proportion on higher boron and higher alcohol and purine diets.

When other factors are ignored, the proportion of people on lower boron diets who had symptoms was 42.5%, compared with 51.7% on higher boron diets.

When boron was ignored, the proportion of people on lower alcohol and purine diets who had symptoms was 41.8%, compared with 59% on higher alcohol or purine diets.

DISCUSSION

People may expect me to ask them to cut down on their alcohol, coffee, yeast or even their red meat. They do not expect to be asked to reduce any of their fruit and fruit juice, or any of their oily fish. They assume that their boron-containing nutritional supplements are beneficial. This suggests that some may admit a high boron intake more willingly than a high alcohol or purine intake.

My suggestion to those with IBS or poor tolerance of toxins is to try avoiding or reducing the foods in Table 6. A Sunday lunch of tomato soup, roast lamb and parsnips, apple pie, cider and a cup of coffee may not be wise. For some people, it may be preferable to obtain omega 3 fatty acids from salmon or a fish oil supplement, rather than from other fatty fish, in order to avoid the high purine content. Fruits containing less boron may be helpful.

A certain type of diet could cause symptoms, or alternatively people with certain symptoms could choose a particular type of diet in the hope of relief. Certain clients report that foods like tomatoes, apples and red meat cause them symptoms which suggests that the diet comes before the symptoms. Moveover, clients often report relief from a diet low in such foods. Research to check on this would be welcome.

People attending a nutrition clinic are not likely to form a cross-section of society. In this case, there are more females than males, few smokers and a high proportion of white-collar workers. The children involved are usually brought for behavioural problems, and are not typical of their cohorts. A study in a hospital could provide a broader base of subjects.

Perhaps one day a series of gastroenterology clinic patients will be matched with otherwise similar but healthy people, and their diets compared for purine, boron, alcohol and caffeine intake. Careful diet diaries would yield more information than the subjective assessments on which my figures are based. Alternatively, a hospital could divide a group of patients randomly into 2 groups. One group could be asked to reduce severely high boron and high purine foods and alcohol, while another group could carry on as before. Their progress could be assessed and compared. Perhaps reducing caffeine should be included in the dietary changes. I have not found any such reports in the literature. The doctor or dietician could hand out sealed envelopes containing diet sheets, so that the patient did not pick up any expectation as to the likely effectiveness of the diet.

Participants in trials could be assessed biochemically, by checking urine for sulphites, to check on sulphite oxidase; checking plasma, for cysteine and sulphate levels, to find out if cysteine is efficiently changed to sulphate; and testing vitamin B2 using red cell glutathione reductase activity.

Dietary advice is often given considering only one risk to be avoided. The population may be told on different occasions how to avoid dental caries, how to avoid cancer, and

TABLE 6. Foods high in boron or purines

Venison, lamb, beef
Apple, pear, peach, plum, prune
Grapes, raisins, sultanas
Tomatoes, peppers
Apple or tomato juice
Mackerel, herring, sardine
Yeast
Coffee, tea, chocolate
Parsnip, broccoli
Rosehip
Hazelnuts, peanuts, almonds

how to avoid heart disease. This leads to confusion, as one idea of what is healthy contradicts another, and by avoiding one disease, one may be increasing the risk factors for another. Confusion may well lead people to ignore all dietary advice. Suggestions for healthy people should consider the risks for a wide variety of diseases that affect the quality of life as well as life expectancy. While it is wise to ask people to consume diets rich in fibre and antioxidants, it does appear that the choice of which vegetables, fruits and nuts matters [15–17]. Moreover, a diet high in anthocyanidins and other bioflavonoids may provide too much phenol for sulphate deficient patients.

CONCLUSION

The results of this investigation show a statistically significant relationship between the consumption of diets high in boron, purines and alcohol, and some chronic digestive problems. Given the high cost of such problems to Social Security, the Health Service, employers, and the sufferers themselves, reduction of these substances in the diet might be a cost-effective treatment. A randomized study would be helpful, to assess the results of such intervention. If this is found to be helpful, further research could be carried out on whether other symptoms resolve on such diets, in addition to digestive ones.

ACKNOWLEDGEMENTS

I wish to thank all my clients, and members of Action Against Allergy, the Irritable Bowel Network, Marple Candida Group, Manchester Well Women's Clinics, Central Manchester ME Group, and other volunteers, who filled in forms about their diets and symptoms. In particular, I wish to thank those clients of mine who, by filling in forms about their digestive symptoms and diets, first alerted me to the possibility of the relationship that I have investigated. I should like to thank Victoria Williams for compiling separate information on the males and females in the study.

REFERENCES

[1] Moss M. Effects of molybdenum on pain and general health: A pilot study. J Nutr Environ Med 1995; 5(1): 55–61.
[2] Scadding GK, Ayesh R, Brostoff J, Mitchell SC, Waring RH, Smith RL. Poor sulphoxidation ability in patients with food sensitivity. BMJ 9 July 1988; 297: 105–7.
[3] Heerdt AS, Young CW, Borgen PI. Calcium glucarate as a chemopreventive agent in breast cancer. Isr J Med Sci 1995; 31: 101–5.
[4] Dwivedi C, Heck WJ, Downie AA, Larroya S, Webb TE. Effect of calcium glucarate on beta glucuronidase activity and glucarate content of certain fruits and vegetables. Biochem Med Metabol Biol April 1990; 43(2): 83–92.
[5] Vallee BL. Zinc biochemistry and physiology. In: Williams RJP, Da Silva JRRF. New Trends in Bio-Inorganic Chemistry. London: Academic Press, 1978; 28–31.
[6] Rajagopalan KV. Molybdenum. In: Frieden E (ed.). Biochemistry of the Ultratrace Elements. New York: Plenum Press, 1984; 149–71.
[7] Braverman ER, Pfeiffer CC. The Healing Nutrients Within: Facts, Findings and New Research on Amino Acids. New Canaan, CT: Keats, 1987.
[8] Varo P, Lähelmä O, Nuurtamo M, Saari E, Koivistoinen P. Mineral Element composition of Finnish Foods VII. Potato, vegetables, fruits, berries, nuts and mushrooms. Acta Agric Scand. Suppl. 22 1980; 89–113.
[9] Dreisbach RH, Robertson WO. Handbook of Poisoning. 12th edn. Norwalk, CT: Appleton & Lange, 1987.
[10] Polson CJ, Green MA, Lee MR. Clinical Toxicology 3rd edn. London: Pitman, 1983.
[11] Varo P, Koivistoinen P. Mineral element composition of Finnish foods. XII. General discussion and nutritional evaluation. Acta Agric Scand Suppl. 22 1980; 165–71.
[12] Roe DA, McCormick DB, Lin R-T. Effects of riboflavin on boric acid toxicity. J Pharm Sci July 1972; 61(7): 1081–5.
[13] Nielsen FH. Other Elements. IV Boron (B). In: Mertz W (ed.) Trace Elements in Human and Animal Nutrition. Orlando: Academic Press, 1986, 420–7.

[14] Travers RL, Rennie GC, Newnham NE. Boron and arthritis: the results of a double-blind pilot study. J Nutr Med 1990; 1: 127–32.
[15] Bland JS. Oxidants and antioxidants in clinical medicine: past, present and future potential. J Nutr Environ Med 1995; 5: 255–80.
[16] Hatch GE. Asthma, inhaled oxidants, and dietary antioxidants. Am J Clin Nutr 1995; 61(suppl): 625S–30S.
[17] Mobarhan S. Micronutrient supplementation trials and the reduction of cancer and cerebrovascular incidence and mortality. Nutr Rev 52(3).

APPENDIX 1: Clinic Questionnaire (Copyright of the author).

NUTRITION AND ALLERGY CLINIC

11 Mauldeth Close, Heaton Mersey, Stockport

Name Mr/Mrs/Ms/Miss _____
Address _____
_____
Tel. no. home _____ work _____
Occupation _____ date of birth _____ gender _____
Any health problems _____
_____
_____
_____
_____
What is your height? _____ What is your weight? _____
What is your normal blood pressure, if you know? _____
List any serious illnesses in your close family: _____
_____
_____
Do you have regular exercise? _____
Do you avoid food containing additives? _____
Do you wash or peel fruit and vegetables before eating them? _____
Do you eat much raw food? _____
When did you last have antibiotics? _____
Please underline, wherever the answer is yes:
Are you pregnant?
Do you take the Pill?
Are you on HRT?
Do you have premenstrual problems?
Do you have hayfever?
Do you crave certain foods?
Do you grind your teeth?
Do you have burning feet?
Do you have thrush?
Do you have aches and pains?
Do you have arthritis?
Do you have irritable bowel syndrome?
Do you have ME or Chronic Fatigue Syndrome?
Do you eat a lot of tomatoes, peppers, peaches, apples, or apricots?
Do you drink more than a glass of alcohol a day?
Do you drink more than a glass of milk a day?
Are you vegetarian?
Are you vegan?
Do you have any silvery grey or gold dental fillings?
Do your gums bleed?
Do you bruise easily?
Do you sleep badly?
Are you sensitive to chemicals?
Do you often drink apple or tomato juice?
Do you eat wheat, rye, oats or barley more than once a day?
Do you have white spots on your finger nails?
Do you fail to remember your dreams?
Do you have asthma?

Do you eat much red meat, yeast, or oily fish?
Are you sensitive to bright lights?
Are your eyes bloodshot, burning, or gritty?
Do you ever have migraine?
Do you drink squash or sodas?
Do you use tapwater for drinking, or making drinks?
Do you use aluminium saucepans?
Do you eat sweets or chocolate?
Do you have nose bleeds?
Do you have varicose veins?
Do you eat much instant food?
Do you drink much tea or coffee?
Do you feel unwell after 6 hours without food?
Do you ever have fits?
Are you planning to have a baby?
Do you often have diarrhoea?
Are you overweight?
Do you smoke?
Do you often feel depressed?
Are you anorexic?
Are you hyperactive?
Do you binge?
Are you autistic?
Do you have eczema?
Are you addicted to anything?
Do you have allergies?
Do you often have infections?
Are you short of energy?
Do you use much sugar?
Do you use sweeteners?
Do you have water retention?
Is there cancer in your family?
Is there heart disease in your family?
Have you had any operations?
Do you take any prescription or over-the-counter drugs?
Do you have acne?
Do you have constipation?
Do you have prematurely greying hair?
Are you often thirsty?
Do you have heavy periods?
Do you have muscle twitches?
Do you have sore knees?
Are you post-menopausal?
Do you eat a lot of salt?
Do you eat a lot of fried food?
Do you have hiccups?
Write down two days' typical intake of food, drinks, snacks, medicines, vitamins, minerals, evening primrose, or other supplements:
Day 1:
Breakfast:
Lunch:
Supper:
Bedtime:
Snacks:
Drinks:
Day 2:
Breakfast:
Lunch:
Supper:
Bedtime:
Snacks:
Drinks:

(signed) _____ date _____