The impact of a food and health education programme on the dietary habits of young Scottish adolescents

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Abstract

A food and health education programme aimed at pupils, staff and parents was launched at a Scottish secondary school in 1993. The effect of this project was evaluated by means of a baseline and follow-up questionnaire survey of pupils' eating habits at age 11-12 years and 13-14 years respectively in the intervention and a control school. During the period of the intervention (1993-95) there was an increase in the percentage of boys consuming non-chipped potatoes and in the percentage of girls taking vegetables and diet drinks, but a decrease in the percentage of boys consuming all soft drinks. Compared to girls proportionally more boys were frequent consumers of breakfast cereals, chips, cakes and biscuits, and meat products and these differences were maintained in the follow-up evaluation.

The results demonstrate the limitations of the curriculum approach to nutrition education and suggest a need for additional approaches to be employed in order to promote changes in dietary behaviour.

Introduction

Dietary intakes may impact on current health, future health and the health of future generations. This particular concern has been expressed in relation to the energy-dense intake of today's adolescents - the parents of tomorrow. There is considerable evidence to show that the average diet of adolescents is far from ideal. Several surveys have suggested that the fat intake of 10-14 year olds has remained high for the last 15 years (Department of Health 1989, McNeil et al 1991, Adamson et al 1992a, Strain et al 1994) and there is evidence of intakes of non-milk extrinsic sugars considerably greater than recommendations (Rugg-Gunn et al 1993, Department of Health 1991). In Scotland, where the average diet of the population is known to be high in fat and added sugar and low in fruit and vegetables, the diet of adolescents may be compromised by family habits as well as the poorer diet of adolescents in general (Anderson et al 1994). McNeil et al (1991) showed that over a quarter of the energy intake of 12 year olds was provided by sweets and cakes and that mean intakes of vital nutrients such as iron and folic acid were less than ideal. The low intake of fruit and vegetables (Adamson et al 1992b, Wrieden and Moore 1995) by young people, particularly boys (Curry and Todd 1991, Wrieden 1996, Hackett et al 1997) is another concern given the research that shows an association of low fruit and vegetable intake with certain cancers (UK Nutritional Epidemiology Group for the Nutrition Society 1993). Not surprisingly, these high fat and sugar diets are low in starchy carbohydrates and non-starch polysaccharides (Adamson et al 1992a, Adamson et al 1992b).

The consequences of this type of diet were summarised in the Scottish Diet Report (Scottish Office 1993). In addition to the long term risk of coronary heart disease and cancers it is well known that a high sugar diet leads to unacceptable levels of tooth decay (Rugg-Gunn 1993). Work by Nelson et al (1993) amongst 12-14 year old children suggests that iron-deficiency anaemia may be common amongst apparently healthy middle class children in suburban London. Given that vitamin C is known to promote the absorption of iron the iron status of children with a lower fruit and vegetable intake is likely to be even poorer.

Current research therefore suggests that young people are failing to put into practice the healthy eating information which is taught in schools. Research in the social sciences has highlighted the fact that it is not a lack of understanding or knowledge about food and nutrition that prevents young people from eating a healthy diet but a range of other sociological factors such as home, gender, peers, the media, availability and price (Morrison 1995, Dennison and Shepherd 1995, Clarke et al 1995). Education programmes to promote healthy eating in schools have had limited success. (Young 1992, Vandongen et al 1995). There is therefore a need for the school based health education programme to go beyond the school, a principle which is encapsulated in the concept of the health promoting school. In such a school one of the criteria should be “the development of good links between the school, the home and the community” (International Planning Committee of the European Network of Health Promoting Schools 1995) as well as attention to classroom activities being supported by the school environment. In the context of healthy eating similar criteria are adopted in the School Nutrition Action Group (SNAG) ideal. These are school based alliances in which staff, pupils and caterers work together to increase the uptake of a healthier diet by improving provision of food and drink in all areas (Passmore and Harvey 1994).

In the work to be described the curriculum of a Scottish school was enhanced by the provision of a food and health teaching package and families of pupils were also provided...
with healthy eating guidance, a suggested eating plan and recipes.

Methods

The programme was carried out at the school over the period 1993-95. A Food Fact File consisting of a series of fact sheets was compiled by the consultant in public health medicine seconded to the project. Copies were given to all parents and teachers and the file was also available as a computer based resource for access by teachers and older pupils. Topics covered included fruit and vegetables, the benefits of the Mediterranean diet, food and exercise, the unhealthy nature of the Scottish diet, fat, sugar and salt. The concluding sheet provided some simple rules for a healthy diet in which fruit and vegetables, bread, pasta, rice, potatoes and fish were promoted positively and chocolates, crisps, biscuits, sweets, burgers, white pudding and canned soft drinks highlighted as foods to be eaten sparingly. The Food Fact File was used to enhance the teaching of the importance of diet to health during social education classes as well as home economics. In classes for the younger pupils simplified versions of the food fact sheets were supported by supplementary pupil-centred activities such as quizzes and word searches. Various 'whole school' activities were implemented to support the teaching. For example, extra choices were provided in the tuck shop and a special exercise and health day was run in conjunction with a school meals week event. In addition, students from the University of Dundee working with a class of first year pupils prepared a healthy recipe book. These were distributed to families of the pupils.

For evaluation purposes a control school was selected where there was no obvious extra attention being given to the subject of diet and health apart from that normally incorporated into the home economics teaching in Scottish schools. Pupils at both schools had easy access to food retail outlets such as ice cream vans, a chip shop and a small supermarket and in addition tuck shops were open in the schools at break times. School meals were provided by the same organisation and were under the jurisdiction of the same local authority. Both the intervention and control schools had mixed catchment areas and were situated in comparatively small market towns (populations 23,060 and 13,478) (Tayside Regional Council 1991). Approval for the study was granted by Tayside Regional Council's Education Department, by the Tayside Committee on Medical Research Ethics, and by the parents of the children involved.

A simplified food frequency questionnaire was used to assess the diets of all first year pupils at the two schools in the autumn of 1993 and again in early summer 1995 when the pupils were completing their second year at school. The questionnaire had been piloted early in 1993 in two final year primary classes in Dundee, i.e. children who would be entering secondary school shortly before the main study began. Pupils were asked how often they ate a range of common foods and were asked to classify the frequency of eating into "never", "less than once a week", "one to three times a week", "four to six times a week" or "every day". In the case of sweets and chocolates, crisps, and sweetened drinks an additional category of "two or more times a day" was provided. The questions were phrased such that the children would assume that this was in relation to a typical week rather than the week just passed. Questions were asked about bread, breakfast cereals and milk consumption in terms of both quantity and type consumed. Pupils were also asked to recall what they had to eat the previous day (and to state if this day was 'normal') and where they normally obtained their lunch on a school day. The food diary was used to check the validity of some answers to the food frequency questions. Questionnaires were excluded if pupils failed to include items in their diary which they claimed to eat every day.

For analysis a selection of foods was chosen which were known for their positive and negative effects on the diet (Tables 1 & 2). These data were analysed using the statistical package SPSS for Windows (SPSS Inc, Chicago, IL 60611) using average frequencies where foods were grouped. The Chi-squared test was used to test for significant differences in the proportions of children eating a food or group of foods frequently compared with those who were not (see Tables 1 & 2 for definitions of frequent eaters). In addition a comparison was done of those making healthy choices for milk, bread and breakfast cereals. Comparisons were made within schools for 1993 and 1995 and between girls and boys for the year groups within schools.

Results

In the baseline evaluation 56% of children in the intervention school drank semi-skimmed milk compared with 42% in the control school (P<0.05). After the intervention 65% of the children claimed to drink semi-skimmed milk but this was not a statistically significant change. The percentage of consumers in the control school remained at 42%. There were no significant changes in the percentage of pupils choosing wholemeal or brown bread (46%), and wholewheat cereal or porridge (32%) in either the intervention or control schools. Tables 1 & 2 show the changes in the percentage of children eating a range of foods perceived to be 'healthy' and 'unhealthy' respectively. The percentage of boys eating non-chipped potatoes at least once a week increased from 1993 to 1995 but there was no change in the percentage of frequent chip eaters. There was a change in the percentage of girls and boys consuming diet squashes and carbonated drinks four or more times a week. The percentage of girls increased from 26% to 46% and that of boys decreased from 45% to 27%. In the girls this increase was partly counteracted by a decrease in the percentage of frequent consumers of sugared squashes and carbonates from 66% to 51% (P=0.055). In boys this percentage fell from 79% in 1993 to 63% in 1995 (P<0.05). The percentage of girls eating vegetables (including salads and pulses) at least once a day increased from 32% to 47% (P<0.05) but there was also a significant increase amongst girls in the percentage of frequent green leafy vegetable consumers in the control school from 15% to 28%.

Figure 1 shows that gender differences in the consumption of certain foods were maintained in all cases except for the diet squashes and carbonated drinks. In 1995 the percentage
TABLE 1
Changes from 1993 to 1995 in the percentage of frequent consumers (defined below) of foods which make a positive contribution to a healthy diet

<table>
<thead>
<tr>
<th>Food</th>
<th>Frequent consumption</th>
<th>% frequent consumers in 1993</th>
<th>Changes in health promoting school</th>
<th>Changes in control school</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bread</td>
<td>3 or more slices per day</td>
<td>48%</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Breakfast cereals</td>
<td>4 or more times a week</td>
<td>77% boys 54% girls**</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Pasta and rice</td>
<td>Once a week or more</td>
<td>58%</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Potatoes (not chips)</td>
<td>Once a week or more</td>
<td>83%</td>
<td>↑ boys P&lt;0.05 girls NS</td>
<td>NS</td>
</tr>
<tr>
<td>Total starchy food portions</td>
<td>4 or more a day</td>
<td>15%</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Citrus fruit and juices</td>
<td>4 times a week or more</td>
<td>43%</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Other fruits</td>
<td>4 times a week or more</td>
<td>46%</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Green leafy vegetables</td>
<td>4 times a week or more</td>
<td>14%</td>
<td>NS</td>
<td>boys NS ↑ girls P&lt;0.05</td>
</tr>
<tr>
<td>Other vegetables</td>
<td>4 times a week or more</td>
<td>27%</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Pulses (including baked beans)</td>
<td>Once a week or more</td>
<td>55%</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Total vegetables (not potatoes)</td>
<td>Once a day or more</td>
<td>36%</td>
<td>boys NS ↑ girls P&lt;0.05</td>
<td>NS</td>
</tr>
<tr>
<td>Total fruit and vegetables (not potatoes)</td>
<td>3 or more times a day</td>
<td>14%</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Fish</td>
<td>Once a week or more</td>
<td>43%</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Diet squashes and carbonated drinks</td>
<td>4 or more times a week</td>
<td>45% boys 26% girls**</td>
<td>↓ boys P&lt;0.05 ↑ girls P&lt;0.01</td>
<td>NS</td>
</tr>
</tbody>
</table>

NS no significant change ** P<0.01 for gender difference 1 The percentage of frequent eaters is given as a combined percentage for boys and girls in the intervention school unless there was a significant difference between them.

TABLE 2
Changes from 1993 to 1995 in the percentage of frequent consumers (defined below) of foods which may have a negative effect on the diet

<table>
<thead>
<tr>
<th>Food</th>
<th>Frequent consumption</th>
<th>% frequent consumers in 1993</th>
<th>Changes in intervention school</th>
<th>Changes in control school</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chips</td>
<td>4-6 times a week</td>
<td>48% boys 32% girls*</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Crisps</td>
<td>2 or more times a day</td>
<td>15%</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Sugared squashes and carbonated drinks</td>
<td>4 or more times a week</td>
<td>73%</td>
<td>↓ boys P&lt;0.05 girls NS</td>
<td>NS</td>
</tr>
<tr>
<td>Sweets and chocolate</td>
<td>2 or more times a day</td>
<td>28%</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Cakes and biscuits</td>
<td>Every day</td>
<td>39% boys 23% girls*</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Meat products</td>
<td>4 or more times a week</td>
<td>35% boys 12% girls***</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

NS no significant change * P<0.05 ** P<0.001 *** P<0.001 for gender differences
Gender differences in the % of frequent consumers of breakfast cereals (BFC), diet drinks (DD), chips (CH), cakes and biscuits (CB) and meat products (MP)

of frequent consumers was higher amongst girls rather than boys. In all other cases where there were significant differences in the percentage of frequent consumers the boys scored the highest.

In both the initial and follow-up surveys about half the pupils at both schools claimed that they obtained their lunch from the school canteen dining room always or at least some of the time. There was a lower percentage of pupils (16% in 1993 and 11% in 1995) who always obtained lunch from the school canteen in the intervention school compared with the control school (30% in 1993 and 27% in 1995).

Discussion

This evaluation was limited to studying the dietary patterns of the first year pupils at the school as they progressed into second year. No attempt was made to study attitudes or awareness but it was believed at the time that the effectiveness of the project could be measured by monitoring changes in the eating behaviour of the pupils compared with a control school. Similar methods of evaluation, using simplified food frequency questionnaires, have enabled other researchers to look at consumption patterns of particular foods or food groups (Currie and Todd 1991, Anderson et al 1994, Hammond et al 1993).

The results of the evaluation suggest that, in the study reported here, health education had limited success and again emphasise the unbalanced nature of the diet in young adolescents (Wrieden and Moore 1995). However, the decrease in soft drink consumption in boys and the switch to diet drinks in girls is likely to reduce dental problems (Rugg-Gunn 1993). Increasing consumption of non-chipped potatoes in boys was also a welcome change as was the increased consumption of vegetables in general amongst girls. However, the increased consumption of green vegetables in the control school suggests that this change may be due to a more general increase in acceptability of vegetables by girls of this age or was possibly a seasonal effect. It must also be noted that a larger percentage of pupils claimed always to use the school canteen for their lunch at the control school, which may have had some bearing on the results. Although no significant change was seen in the proportion of those consuming semi-skimmed milk, 65% of the 13-14 year old pupils at the intervention school were drinking this type of milk by 1995, compared with the Scottish Diet target of 75% for the year 2005 (Scottish Office 1993).

The current ‘settings’ approach to health promotion (Baric 1993) has emphasised the value of a holistic approach where education is supported by the total environment (Tones 1996). Notwithstanding the strong support given by the teaching staff; the provision to all parents of the most recent information on the links between eating patterns and health and disease, supported by a detailed meal programme and recipes; and the incorporation of this information into the teaching curriculum for first year pupils, the eating patterns of the pupils showed only a marginal improvement over the 18 month period of the study. This confirms that the provision of such information, even coupled with initiatives

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such as SNAGs, will not, on its own, change dietary patterns for the better. Other factors, including local availability and price of 'healthy' foods and the way such food is advertised and marketed, may be more influential in persuading parents and their children what they should eat and may also influence their response to advice on nutrition. It is therefore recommended that priority be given to research into the social, commercial, geographic and economic factors which mediate parental and family choice of food and which may encourage or discourage change to healthier eating patterns.

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References


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