Institutional dietary provision for diabetic patients

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Summary

We compared the diet of residents with diabetes with current British Diabetic Association (BDA) recommendations, and the nutritional adequacy and content of the diet using 3-day food diaries. We studied 52 residents with diabetes and 48 age- and sex-matched controls from 37 nursing, residential and elderly mentally infirm homes in one city. The daily intake of fat, protein, carbohydrate and fibre of the group with diabetes did not comply with current BDA guidelines, and 52% of diabetic residents and 46% of controls had a lower daily energy intake than currently recommended. The diet of diabetic residents did not comply with current recommendations. Undernutrition is common in both groups.

Introduction

Information on dietary practices for older patients with diabetes living in nursing or residential homes in the UK is lacking. This is not surprising, as they form one of the most neglected sectors of the diabetic population, despite the fact that diabetes is one of the commonest chronic diseases. We have assessed, in what we believe to be one of the first formal studies, whether residents with diabetes are receiving an appropriate diabetic diet (compared with the British Diabetic Association (BDA) recommendations for the 1990s) and the nutritional adequacy of this (compared with Committee On Medical Aspects of Food Policy).

Methods

Fifty-two residents with diabetes (DG) were randomly selected from 18 nursing, 12 residential, five elderly mentally infirm and two dual registered homes in the catchment area of one hospital in Liverpool, UK. Controls (CG) were 48 age- and sex-matched non-diabetic residents living in the same home. Diet was assessed using three-day food diaries (from the resident and/or nursing staff), and computer-analysed using ‘COMPEAT’, (version 5, Nutrition Systems, London). Intakes of protein, fat, fibre and carbohydrate were compared with BDA dietary recommendations. The nutritional adequacy was compared with national dietary reference values for key nutrients.

All patients were assessed using the modified Barthel ADL index (BBI) and abbreviated mental test score (AMTS). The shortened version of the geriatric depression scale (GDS-15) was administered to those patients who scored ≥ 7 on the AMTS.

Ethical approval was obtained for the study. Statistical analyses were performed using ARCUS (copyright Dr I. Buchan, Medical Computing, Aughton, UK). Normality of data distribution was assessed using the Shapiro-Wilk test. Differences between groups were assessed using the Mann-Whitney U test. Fisher’s exact test was used to assess differences between discrete variables. Relationships between two variables were assessed using Spearman’s rank correlation. Significance was defined at the 5% level.

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Results

Demographic details are shown in Table 1. There were no significant differences between the 52 diabetic subjects and 48 controls in age, sex, duration of stay in homes, Barthel activities of daily living score, body mass index, geriatric depression score or mental test score.

The group with diabetes was not receiving the recommended daily intakes of fat, protein, carbohydrate or fibre: fat intake 39.3 ± 0.6% of daily energy intake (mean ± SEM) compared with a recommendation of 30–35%; 44.8 ± 0.6% carbohydrate compared with a recommendation of 50–55%; 15.5 ± 0.4% protein compared with a recommendation of 10–15%; 12.9 ± 0.5 g fibre compared with a recommendation of >30 g/day. Diabetic residents had a significantly higher daily intake of both protein (p<0.01) and fibre (p<0.001) compared with the control group (Table 2).

Ten (19%) diabetic patients and 11 (23%) control residents were underweight (body mass index, BMI <20 kg/m², p = NS). Only four (8%) diabetic and three (6%) control residents were obese (BMI >30 kg/m², p = NS). Twenty-seven (52%) diabetic and 22 (46%) control residents had an energy intake less than the estimated average daily requirements for their age and sex3,4 (p = NS). There was no relationship between daily energy intake and BMI in either group.

Although there was an adequate mean intake of nutrients (except vitamin D) for both groups, a number of people in each group had daily intakes below the recommended values (Table 3). Significantly more control than diabetic residents had a low daily iron intake (p<0.05). All diabetic residents and 47 (98%) of the control group had a vitamin D intake below the daily recommended value (reference nutrient intake) (p = NS) but despite this none of them were receiving vitamin D supplementation. There was a direct correlation in both groups between daily energy intake and daily intake of vitamin D (p<0.001 DG, p<0.0001 CG), calcium (p<0.0001 DG and CG), fibre (p<0.01 DG, p<0.0001 CG) and iron (p<0.0001 DG and CG).

Discussion

The diet of the group with diabetes did not comply with current UK diabetic guidelines, with a lower carbohydrate and fibre, and higher fat and protein intake than advised. This is one of the first detailed studies specifically examining the dietary composition of elderly, institutionalized diabetic patients. Studies have been performed in the USA of diabetic residents,8,9 but the system of care is different from that in the UK. Moreover, dietary recommendations

Table 1 Demographic details of residents

<table>
<thead>
<tr>
<th></th>
<th>Diabetics</th>
<th>Controls</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>52</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>79.2 ± 1.1</td>
<td>80.0 ± 1.0</td>
<td>NS</td>
</tr>
<tr>
<td>Sex (M:F)</td>
<td>17:35</td>
<td>13:35</td>
<td>NS</td>
</tr>
<tr>
<td>Treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diet</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OHAs</td>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulin</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>24.0 ± 0.6</td>
<td>24.1 ± 0.6</td>
<td>NS</td>
</tr>
<tr>
<td>Years in home</td>
<td>3 (0.2–45)</td>
<td>2.4 (0.1–10)</td>
<td>NS</td>
</tr>
<tr>
<td>BAI</td>
<td>10 (1–20)</td>
<td>13 (1–20)</td>
<td>NS</td>
</tr>
<tr>
<td>MTS</td>
<td>8.5 (0–10)</td>
<td>8 (1–10)</td>
<td>NS</td>
</tr>
<tr>
<td>GDS</td>
<td>5 (0–12)</td>
<td>7 (1–12)</td>
<td>NS</td>
</tr>
<tr>
<td>(n = 44)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(n = 43)</td>
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<td></td>
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</tbody>
</table>

Data are means ± SEM or medians (range). BMI, body mass index; BAI, Barthel ADL index; GDS, geriatric depression score-15; MTS, abbreviated mental test score; OHAs, oral hypoglycaemic agents.

Table 2 Daily intake of food groups (as % of daily energy intake) and fibre

<table>
<thead>
<tr>
<th></th>
<th>Diabetics</th>
<th>Controls</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>52</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Daily energy intake (kcal)</td>
<td>1934 ± 49.5</td>
<td>1960 ± 74.2</td>
<td>NS</td>
</tr>
<tr>
<td>Protein</td>
<td>15.5 ± 0.4%</td>
<td>13.7 ± 0.3%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>44.8 ± 0.6%</td>
<td>46.7 ± 0.9%</td>
<td>NS</td>
</tr>
<tr>
<td>Fat</td>
<td>39.3 ± 0.6%</td>
<td>45.0 ± 6.3%</td>
<td>NS</td>
</tr>
<tr>
<td>Fibre</td>
<td>12.9 ± 0.5 g</td>
<td>9.9 ± 0.6 g</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Data shown as mean ± SEM.
for people with diabetes, including older people, vary between countries.\textsuperscript{2,10–12}

The optimal dietary guidelines for the frail older person with diabetes are unknown.\textsuperscript{10,13,14} The BDA recommendations are aimed at adults of all ages, and although they contain a small section on the elderly, in general they do not consider the institutionalized person with diabetes.\textsuperscript{3} It may be that the carbohydrate intake of residents was sufficient for this age group. Undoubtedly, diet is the mainstay of treatment for all diabetic patients, but there have been few studies examining the role of diet therapy in the frail elderly person. However, one small short-term study has shown that there was no deterioration in metabolic control if a normal diet was substituted for a diabetic diet.\textsuperscript{15} In this study, we did not assess the relationship of diet to metabolic control, as it was not possible to obtain complete information on glycosylated haemoglobin from all residents.

Although in the younger type 2 diabetic person obesity is common, this study has shown that a low BMI is more common than obesity in residents with diabetes. Both diabetic and control groups had a similar but high number of residents who were underweight. Undernutrition is well recognized as an area of concern in older people in general,\textsuperscript{16,17} in hospitals\textsuperscript{18} as well as in institutions.\textsuperscript{19–22} Mooradian et al.\textsuperscript{8} reported that 21% of nursing home diabetic residents were underweight. The factors contributing to the low body weight in institutions are multiple,\textsuperscript{9,16,22–25} and in the diabetic group could have included poor metabolic control. Many patients with diabetes in this study had a low daily energy intake, although there was no direct relationship between this and BMI. It is possible, for instance, that too vigorous an attempt to reduce the daily fat intake could contribute to, or worsen, the low daily energy intake reported in this study. Restricted diets have previously been suggested as potential contributors to malnutrition,\textsuperscript{26} and the risk of malnutrition could potentially outweigh the risks of rigid diabetic diet intervention.\textsuperscript{13}

The use of BMI as a marker of nutrition in the elderly has been questioned.\textsuperscript{18,19} Future studies should perhaps use other anthropometric markers. However, in practice simply weighing patients on admission and at regular intervals could easily be used to ensure no undesirable weight loss, as has been recommended for all elderly institutionalized people.\textsuperscript{27}

Poor calorie intake is a major risk factor for the development of vitamin and trace mineral deficiencies.\textsuperscript{8} In the present study, although the overall nutritional adequacy of the diet was satisfactory for both groups, a number of people in each group had daily intakes below the reference nutrient intake.\textsuperscript{3,4} There were few differences between the diabetic and non-diabetic groups in nutrient intake except for iron. Elderly diabetic patients have problems with nutrient intake similar to those of people with other chronic diseases.\textsuperscript{28} Nearly every resident, whether diabetic or not, had a low vitamin D intake. Vitamin D supplementation should be considered for all elderly people, particularly during the winter,\textsuperscript{29} and if living in institutions where adequate sunlight exposure is not possible.\textsuperscript{4}

It is well recognized that energy intake in the chronically ill or disabled can be so low that adequate intakes of nutrients are unlikely to be met unless the nutrient density of the diet is unusually high.\textsuperscript{4} Although nutrient intake was similar in the two groups, a diabetic diet could at least have contributed to the deficiencies in that group and could be made worse by further imposition of a restrictive diet.

There are some potential limitations to this study. For instance, using three-day food diaries may have limited the assessment of intake of some nutrients which appear on menus infrequently. Similarly, relying on a variety of staff and residents to record food intake may have increased variability in the results. Although, carbohydrate intake was below current recommendations, we did not examine the composition of the carbohydrate.

The optimal system of care for all older people living in institutions is being questioned,\textsuperscript{10} and diabetic residents in institutions present particularly complex medical problems.\textsuperscript{31,32} Based on 1994 figures, there are approximately 150 000 people in nursing or residential homes in the UK,\textsuperscript{33} suggesting at least 15 000 people with diabetes in institutions.\textsuperscript{1} Although diets should be individualized (and should form part of every resident’s care plans), national recommendations on nutrition for elderly diabetic residents should be developed, as has been done elsewhere.\textsuperscript{9} This should form part of an overall improvement in the general management of older diabetic residents.\textsuperscript{1,34,35}

References


