Relationship between diet composition and body mass index in a group of Spanish adolescents

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(Received 5 October 1994 – Revised 22 February 1995 – Accepted 13 March 1995)

The dietary patterns of sixty-four adolescents (thirty-seven young men and twenty-seven young women) between 15 and 17 years of age were examined by analysis of food, energy and nutrient intakes, over a period of 5 d, including a Sunday. Adolescents were identified for inclusion in two study groups: (1) overweight and obese subjects (O) with a BMI (kg/m²) ≥ 75th percentile, and (2) subjects of normal weight (NW) with BMI < 75th percentile. The study was designed to investigate the differences between the energy and nutrient intakes of NW and O adolescents. No differences were found in energy intake between NW and O adolescents. However, O subjects derived a greater proportion of their energy from proteins (19.8% v. 16.4% for NW subjects) and fats (45.4% v. 38.7% for NW subjects), and less from carbohydrates (34.6% v. 44.6% for NW subjects). Also, O subjects consumed significantly larger amounts of cholesterol. In order to prevent obesity and avoid the disorders associated with this condition, it appears necessary not only to regulate energy intake, but also to control the composition of the diet. Given that it is during infancy that feeding habits are developed, it is important to ensure that correct habits are acquired. Special attention should be given to improving the dietary habits of overweight and obese children and adolescents.

Obesity: Adolescence: Dietary survey

Obesity is the most prevalent nutritional disease of children and adolescents in developed countries (Gortmaker et al. 1987; Dietz, 1993). In Spain, nearly 20% of schoolchildren are either overweight or obese (Moya, 1992; Vazquez et al. 1992). Overweight in childhood is related to morbidity and mortality rates in adulthood (Must et al. 1992; Garrison & Kannel, 1993). Weight during childhood is an important determinant of whether a subject will be overweight as an adult (Kolata, 1986; Guo et al. 1994). It has been estimated that 40% of children who are obese at the age of 7 years become obese adults, whereas > 70–80% of obese adolescents become obese adults (Kolata, 1986).

It would appear that an imbalance in energy intake is not the only factor in the aetiology of obesity. The composition of the diet also seems to be a determinant. Miller et al. (1990) showed that as the Quetelet index increased, the quality of the diet decreased; intakes of vitamins and fibre fell and the percentage of energy intake derived from fat increased. It is possible that the less adequate diet of obese adolescents, or their less adequate nutritional status, contribute to the long-term impairment of their health and perpetuate their obesity.
The purpose of the present research was to examine the differences between the energy and nutrient intakes of normal and overweight/obese adolescents.

**METHODS**

A survey was made of the food, energy and nutrient intakes of sixty-four adolescents (thirty-seven young men and twenty-seven young women) aged between 15 and 17 years, living in the Comunidad Autónoma de Madrid, Spain. The personal and anthropometric characteristics of the sample are given in Table 1.

The study was performed at a secondary school with a student population of medium socioeconomic level. Using aleatory numbers, a sample of 100 students was selected at random. The selected students and their parents were invited to a meeting where the investigation was explained. After presentation of the study protocol, written consent was obtained from parents of interested subjects. Of the selected subjects, 64% took part in the study. These subjects made up 43% of the school population of this age group. None had any illness or took any medication or supplements that might interfere with the results.

The study was approved by the Human Research Review Committee of the Universidad Complutense of Madrid, Faculty of Pharmacy.

**Anthropometric survey**

Weight and height were determined, without shoes, using a digital electronic weighing scale (Seca Alpha; range 0.1–150 kg) and a Harpenden digital stadiometer (range 0.7–2.05 m) respectively. From the anthropometric data we calculated the BMI (Quetelet index, kg/m²) and nutritional index:

\[
\frac{\text{(weight/height)}}{(\text{50th percentile weight/50th percentile height})} \times 100.
\]

The 50th percentile weights and heights were calculated using the data of Hernández et al. (1988) as reference values representative of Spanish children and adolescents.

Subjects were divided into two groups: (1) overweight and obese (O) subjects with a BMI > 23 kg/m² and, (2) normal-weight (NW) subjects with a BMI < 23 kg/m².

A point of reference of 23 kg/m² was chosen following the criteria of Rolland-Cachera et al. (1982), Weststrate & Deurenberg (1989) and Hernández (1993). These authors indicate that in children the diagnosis of obesity is based on age- and sex-specific reference standards for weight-for-height or weight–height indices. The limits for normal weight in the present study ranged from percentiles 25 to 75. Percentiles 75 to 90 were taken to show overweight and beyond 90 to represent obesity, in agreement with Rolland-Cachera et al. (1982), Sánchez et al. (1991) and Hernández (1993). The limit of separation between groups was decided as 23 kg/m² based on this being the 75th percentile of the sample’s BMI values and also that of Hernández et al. (1988).

**Physical activity**

In order to calculate energy expenditure, subjects answered a questionnaire on their activity patterns. Subjects indicated the length of time spent on each activity (e.g. sleeping, eating, playing) following the questionnaire of Sarria et al. (1987). Time spent participating in sport was supervised and validated by teachers of physical education.
Table 1. *Personal and anthropometric data for the study population*  
(Mean values and standard deviations)

<table>
<thead>
<tr>
<th></th>
<th>BMI &lt; 23 kg/m²</th>
<th>BMI ≥ 23 kg/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Males (n)</td>
<td>15·9</td>
<td>0·7</td>
</tr>
<tr>
<td>Females (n)</td>
<td>16·7</td>
<td>0·9</td>
</tr>
<tr>
<td>Age (years)</td>
<td>5·7</td>
<td>8·5</td>
</tr>
<tr>
<td>Height (m)</td>
<td>1·678</td>
<td>0·093</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>20·4</td>
<td>1·7</td>
</tr>
<tr>
<td>Nutritional index* (%)</td>
<td>98·6</td>
<td>9·0</td>
</tr>
</tbody>
</table>

* Mean values were significantly different from those for the normal weight group, independent of sex, P < 0·05.
† Mean value was significantly different from that for the normal weight group, with interaction of sex, P < 0·05.
‡ See p. 766.

*Dietary survey*

A prospective ‘food record questionnaire’ was completed over 5 consecutive days including a Sunday. The experimental period (Sunday to Thursday of the second week of February 1991) was chosen at random after rejecting the first and last weeks of each month and also periods close to holidays and examinations. Kitchen scales were provided to all the subjects’ parents in order to facilitate the weighing of food eaten at home. For meals consumed outside the home, quantities were measured using household measures (i.e. cups, glasses, ladles etc.). Ration weight was then established against standard mean sizes (Alcoriza *et al.* 1990).

After the questionnaire was completed the booklets were returned in person. A qualified nutritionist inspected the records to ensure that they were complete and that sufficient detail had been recorded. In the same interview a ‘food-frequency intake’ questionnaire was completed in order to contrast subjects’ answers with the results of their 5 d dietary record. The food-frequency intake questionnaire asked the number of times (per day, week or month) that different foods were consumed, following a modified version of the method used by Mullen *et al.* (1984).

The energy and nutrient contents of all foods ingested were determined using Spanish food composition tables (Instituto de Nutrición, 1994). Tables of recommended intakes of energy and nutrients for the Spanish population issued by the Departamento de Nutrición (1994) were employed to calculate the recommended dietary intake (RDI) for this population group.

Energy expenditure was estimated using equations proposed by the World Health Organization (1985) and multiplying by an activity coefficient in accordance with the criteria of several expert groups (World Health Organization, 1985; National Research Council, 1989). Comparing food intakes with RDI values allowed the assessment of the adequacy of subjects’ diets.

*Statistical analysis*

Mean values and standard deviations are shown. The degree of significance of differences between means was calculated using Student’s *t* test and co-variance analysis. In those cases where the distribution of results was not homogeneous, the Mann–Whitney test was
Table 2. Food intakes (g/d) amongst normal-weight and overweight or obese Spanish adolescents
(Mean values and standard deviations)

<table>
<thead>
<tr>
<th></th>
<th>BMI &lt; 23 kg/m²</th>
<th>BMI ≥ 23 kg/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Number of foods (/5d)</td>
<td>35.6</td>
<td>5.8</td>
</tr>
<tr>
<td>Total food intake</td>
<td>1687.7</td>
<td>506.6</td>
</tr>
<tr>
<td>Cereals</td>
<td>237.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Dairy products</td>
<td>381.5</td>
<td>217.0</td>
</tr>
<tr>
<td>Eggs</td>
<td>31.7</td>
<td>19.2</td>
</tr>
<tr>
<td>Fats and oils</td>
<td>25.0</td>
<td>13.7</td>
</tr>
<tr>
<td>Sugar</td>
<td>11.5</td>
<td>15.5</td>
</tr>
<tr>
<td>Vegetables</td>
<td>170.2</td>
<td>73.5</td>
</tr>
<tr>
<td>Legumes</td>
<td>22.8</td>
<td>25.6</td>
</tr>
<tr>
<td>Fruits</td>
<td>229.7</td>
<td>193.1</td>
</tr>
<tr>
<td>Meat products</td>
<td>179.4</td>
<td>86.0</td>
</tr>
<tr>
<td>Fish products</td>
<td>51.8</td>
<td>38.8</td>
</tr>
<tr>
<td>Non-alcoholic beverages</td>
<td>141.4</td>
<td>177.1</td>
</tr>
<tr>
<td>Alcoholic beverages</td>
<td>6.5</td>
<td>20.6</td>
</tr>
<tr>
<td>Miscellaneous foods</td>
<td>52.3</td>
<td>41.3</td>
</tr>
</tbody>
</table>

* Mean values were significantly different from those for the normal-weight group, P < 0.05.

applied. Where the Student’s t and Mann–Whitney tests showed differences to be significant, covariance analysis was performed in order to separate the influences of BMI and sex. Spearman rank correlation coefficients between dietary and anthropometric data were also calculated. P values of < 0.05 were considered to indicate statistical significance.

RESULTS

Table 1 shows the personal and anthropometric data for the experimental population.

Descriptive data of food consumption presented in Table 2 shows that adolescents with BMI < 23 kg/m² took a larger number of foods. The intake of eggs (r 0.41, P < 0.001) and fish (r 0.24, P < 0.05) rose with BMI, whereas that of fruit (r -0.30, P < 0.05) declined as BMI rose.

No differences were observed in the energy intakes of O and NW subjects (Table 3). Some cases of underreporting can be seen, derived by subtracting self-reported energy intake, obtained from the 5 d diet record, from predicted total daily energy expenditure. The percentage of underreporting (energy expenditure—energy intake) × 100/energy expenditure) was greater by subjects with BMI ≥ 23 kg/m² than by NW subjects. However, the difference was not significant given the wide spread of results, though the sample size may have had an influence (only twelve subjects with BMI ≥ 23).

The contributions of protein and fat to the total energy intake were greater in O subjects; the contribution of carbohydrates was therefore less than in NW subjects. Consequently, the protein:carbohydrate and fat:carbohydrate ratios were significantly higher in adolescents with higher Quetelet indices (Table 4). With respect to the consumption of carbohydrates, both the intake of sugar and that of fruit (Table 2) was less in O subjects though the difference was not significant. It is possible that obese subjects underestimated their intake of sugar. O subjects consumed greater amounts of cholesterol and niacin than NW subjects (Table 4).
Table 3. Energy intake and energy expenditure by normal-weight and overweight or obese Spanish adolescents
(Means and standard deviations)

<table>
<thead>
<tr>
<th></th>
<th>BMI &lt; 23 kg/m²</th>
<th></th>
<th>BMI ≥ 23 kg/m²</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Energy intake (kJ/d)</td>
<td>10157</td>
<td>2869</td>
<td>10707</td>
<td>5028</td>
</tr>
<tr>
<td>(kcal/d)</td>
<td>2428</td>
<td>686</td>
<td>2559</td>
<td>1202</td>
</tr>
<tr>
<td>Resting metabolic rate (kJ/d)</td>
<td>6642</td>
<td>867</td>
<td>7346†</td>
<td>1389</td>
</tr>
<tr>
<td>(kcal/d)</td>
<td>1587</td>
<td>207</td>
<td>1755†</td>
<td>332</td>
</tr>
<tr>
<td>Energy expenditure (kJ/d)</td>
<td>10396</td>
<td>1543</td>
<td>11468*</td>
<td>2420</td>
</tr>
<tr>
<td>(kcal/d)</td>
<td>2484</td>
<td>369</td>
<td>2740*</td>
<td>577</td>
</tr>
<tr>
<td>Energy intake × 100/expenditure</td>
<td>98.8</td>
<td>24.5</td>
<td>90.9</td>
<td>27.6</td>
</tr>
<tr>
<td>Energy intake &lt; expenditure (%)</td>
<td>48</td>
<td></td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Underreporting (kJ/d)</td>
<td>158</td>
<td>370</td>
<td>594</td>
<td>1020</td>
</tr>
<tr>
<td>(kcal/d)</td>
<td>38</td>
<td>88</td>
<td>142</td>
<td>243</td>
</tr>
<tr>
<td>Underreporting (%)</td>
<td>1.2</td>
<td>3.5</td>
<td>9.1</td>
<td>8.8</td>
</tr>
</tbody>
</table>

* Mean values were significantly different from those for the normal-weight group, independent of sex, \( P < 0.05 \).
† Mean values were significantly different from those for the normal-weight group, with interaction of sex, \( P < 0.05 \).

DISCUSSION

Of the total sample, 18.8% had BMI ≥ 23 kg/m². Obesity (BMI values > 90th percentile of reference figures; Hernández et al. 1988) affected 4.7% of the subjects. The percentage of overweight subjects was similar to figures reported for other Spanish schoolchildren (Moya, 1992; Vazquez et al. 1992).

The intakes of food, energy and nutrients were similar to those obtained in earlier studies (Ortega et al. 1989, 1990, 1993; Spyckerelle et al. 1992; Löwik et al. 1994). In agreement with Gazzaniga & Burns (1993) and Miller et al. (1994), the most significant finding of this survey was that diet composition, rather than energy consumption, was the main factor associated with obesity in both young men and women. No differences were observed in total energy intake between O and NW subjects (Table 3). These data agree with previous studies (Trembley et al. 1989; Miller et al. 1990, 1994; Slattery et al. 1992) which indicate that obese individuals consume no more energy than their normal-weight counterparts.

The literature has reflected concern regarding the accuracy of derived energy intake values for the obese population. Several studies have indicated that obese individuals tend to underestimate their food intake and overestimate their physical activity (Lichtman et al. 1992; Westerterp et al. 1992). There does appear to be a certain degree of underreporting. This is derived by subtracting self-reported energy intakes, obtained from the 5 d dietary record, from predicted total daily energy expenditure (Table 3). In agreement with Bandini et al. (1990), both normal and overweight adolescents underreported food intake though this was more pronounced amongst overweight and obese subjects: 9.1% in O adolescents compared with 1.2% in NW subjects (Table 3). These figures (Table 3) are lower than those reported by Bandini et al. (1990) who found underreporting of almost 30% in obese adolescents. However, it should be noted that the experimental population in this study was composed mostly of overweight subjects. Obese subjects made up only 4.7% of the present study population.
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Table 4. Energy and nutrient intakes amongst normal-weight and overweight or obese Spanish adolescents

(Mean values and standard deviations)

<table>
<thead>
<tr>
<th></th>
<th>BMI &lt; 23 kg/m²</th>
<th></th>
<th>BMI ≥ 23 kg/m²</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Protein (g/d)</td>
<td>98.6</td>
<td>28.9</td>
<td>119.0</td>
<td>43.0</td>
</tr>
<tr>
<td>(% energy)</td>
<td>16.4</td>
<td>28</td>
<td>19.8*</td>
<td>4.6</td>
</tr>
<tr>
<td>Carbohydrate (g/d)</td>
<td>290.1</td>
<td>95.3</td>
<td>208.7</td>
<td>101.9</td>
</tr>
<tr>
<td>(% energy)</td>
<td>44.6</td>
<td>6.0</td>
<td>34.6*</td>
<td>9.4</td>
</tr>
<tr>
<td>Fat (g/d)</td>
<td>104.4</td>
<td>34.4</td>
<td>123.2</td>
<td>43.0</td>
</tr>
<tr>
<td>(% energy)</td>
<td>38.7</td>
<td>5.4</td>
<td>45.4†</td>
<td>6.4</td>
</tr>
<tr>
<td>PUFA (g/d)</td>
<td>9.8</td>
<td>3.6</td>
<td>12.1†</td>
<td>3.9</td>
</tr>
<tr>
<td>(% energy)</td>
<td>3.7</td>
<td>0.8</td>
<td>4.7</td>
<td>1.9</td>
</tr>
<tr>
<td>MUFA (g/d)</td>
<td>46.6</td>
<td>15.9</td>
<td>57.5</td>
<td>18.3</td>
</tr>
<tr>
<td>(% energy)</td>
<td>37.0</td>
<td>13.5</td>
<td>41.4</td>
<td>20.1</td>
</tr>
<tr>
<td>SFA (g/d)</td>
<td>13.6</td>
<td>2.3</td>
<td>14.5</td>
<td>1.8</td>
</tr>
<tr>
<td>Protein:carbohydrate</td>
<td>0.35</td>
<td>0.1</td>
<td>0.66*</td>
<td>0.2</td>
</tr>
<tr>
<td>Fat:carbohydrate</td>
<td>0.37</td>
<td>0.1</td>
<td>0.66*</td>
<td>0.3</td>
</tr>
<tr>
<td>Cholesterol (mg/d)</td>
<td>410.7</td>
<td>141.9</td>
<td>514.1*</td>
<td>106.5</td>
</tr>
<tr>
<td>Fibre (g/d)</td>
<td>18.4</td>
<td>7.6</td>
<td>15.9</td>
<td>10.3</td>
</tr>
<tr>
<td>Thiamin (mg/d)</td>
<td>1.4</td>
<td>0.4</td>
<td>1.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Riboflavin (mg/d)</td>
<td>1.7</td>
<td>0.5</td>
<td>2.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Pyridoxine (mg/d)</td>
<td>1.5</td>
<td>0.5</td>
<td>1.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Niacin (mg/d)</td>
<td>34.0</td>
<td>11.0</td>
<td>42.2*</td>
<td>11.0</td>
</tr>
<tr>
<td>Pteroylglutamate (µg/d)</td>
<td>172.8</td>
<td>72.1</td>
<td>186.4</td>
<td>68.1</td>
</tr>
<tr>
<td>Vitamin B₁₂ (µg/d)</td>
<td>5.3</td>
<td>3.7</td>
<td>6.5</td>
<td>2.7</td>
</tr>
<tr>
<td>Vitamin C (mg/d)</td>
<td>120.2</td>
<td>81.5</td>
<td>112.9</td>
<td>53.8</td>
</tr>
<tr>
<td>Vitamin A (µg/d)</td>
<td>949.0</td>
<td>810.4</td>
<td>711.0</td>
<td>279.2</td>
</tr>
<tr>
<td>Vitamin D (µg/d)</td>
<td>3.1</td>
<td>2.6</td>
<td>6.4</td>
<td>6.4</td>
</tr>
<tr>
<td>Vitamin E (mg/d)</td>
<td>3.9</td>
<td>1.4</td>
<td>5.6</td>
<td>3.3</td>
</tr>
<tr>
<td>Iodine (µg/d)</td>
<td>324.7</td>
<td>178.9</td>
<td>507.9</td>
<td>385.3</td>
</tr>
<tr>
<td>Zinc (mg/d)</td>
<td>11.5</td>
<td>3.6</td>
<td>13.3</td>
<td>6.7</td>
</tr>
<tr>
<td>Magnesium (mg/d)</td>
<td>250.4</td>
<td>80.0</td>
<td>267.2</td>
<td>102.0</td>
</tr>
<tr>
<td>Iron (mg/d)</td>
<td>13.8</td>
<td>3.9</td>
<td>14.7</td>
<td>7.3</td>
</tr>
<tr>
<td>Calcium (mg/d)</td>
<td>905.1</td>
<td>347.2</td>
<td>1242.2</td>
<td>711.4</td>
</tr>
</tbody>
</table>

PUFA, polyunsaturated fatty acids; MUFA, monounsaturated fatty acids; SFA, saturated fatty acids.

* Mean values were significantly different from those for the normal-weight group, independent of sex, P < 0.05.
† Mean value was significantly different from that for the normal-weight group, with interaction of sex, P < 0.05.

It might be expected that underreporting by obese subjects would primarily refer to the intake of high-fat and highly sugared foods, since consumption of these foods is often associated with guilt and shame. It is likely that O adolescents underreported their consumption of sugar because they reported lesser amounts of sugar consumed than NW subjects (Table 2). As found by Miller et al. (1990), fat intake was higher in O subjects. However, if these subjects underreported the consumption of fatty foods, it is possible that there was an even greater difference between the true levels consumed by this group and those reported by NW subjects (Table 4). O subjects, also, may overestimate their physical activity (Lichtman et al. 1992), in which case the true expenditure of energy would be less than the results suggest.
With respect to differences in dietary composition as a function of BMI, authors such as Gazzaniga & Burns (1993) and Miller et al. (1994) found that both obese men and women derived a greater percentage of their energy from fat, and less from carbohydrate, compared with their leaner counterparts. They also showed that lean men and women consumed significantly more fibre than obese subjects.

The results of the present survey show greater contributions of fat and protein to the total energy intake of O subjects. NW subjects showed a higher percentage contribution made by carbohydrate. Also, O subjects consumed significantly larger amounts of cholesterol (Table 4).

The percentage of energy derived from fat rose with BMI ($r = 0.36$, $P < 0.01$); so too did the intake of cholesterol ($r = 0.40$, $P < 0.01$) and protein:carbohydrate ($r = 0.35$, $P < 0.01$) and fat:carbohydrate ratios ($r = 0.46$, $P < 0.001$). There was a fall in the percentage of energy derived from carbohydrate ($r = -0.33$, $P < 0.05$) and in the intake of carbohydrate for every 4184 kJ (1000 kcal) ($r = -0.45$, $P < 0.001$).

The percentages of total energy intake from protein and fat exceeded the recommended limits (12 and 30% energy respectively; National Research Council, 1989; Ministerio de Sanidad y Consumo, 1991) in both groups. The proportion of energy derived from carbohydrate was slightly deficient. This imbalance, frequent in developed countries, has been noted in previous studies (Ortega et al. 1989, 1990, 1993). The situation was worse in O subjects, and could lead to impairment of their health (National Research Council, 1989); 93.2% O adolescents and 88.5% NW adolescents consumed more than 30% energy as fat, and 100% O adolescents and 92.3% NW adolescents showed percentages of energy from protein of over 12%. Further, 56.8% O adolescents and 42.3% NW adolescents consumed less than 40% energy as carbohydrate.

In agreement with the findings of Miller et al. (1994), fibre intake was lower in O adolescents than NW subjects, though the difference was not statistically significant.

More than 50% of the population showed intakes of pyridoxine, vitamin D, vitamin E, Zn and Mg that were lower than the RDI. Although the true intake of some of these nutrients must be superior to the results shown (given the observed underreporting), it would remain advisable to guard against any deficit of these micronutrients.

The results of the present study emphasize the existence of imbalances in the diets of adolescents which may damage their health and quality of life. Imbalances in the contribution of macronutrients to the total energy intake appear to be greater in O adolescents (Table 4). This group also consumes larger amounts of cholesterol. The poorer composition of obese subjects’ diets may be the cause of illness in this section of the population (National Research Council, 1989).

In order to prevent obesity, and to avoid the disorders associated with this condition, it appears to be necessary not only to regulate energy intake (it is important to ensure a balance between energy intake and energy output), but also to control the composition of the diet (Gazzaniga & Burns, 1993). Given that it is during infancy that feeding habits are developed (Farris & Nicklas, 1993), it is important to ensure that correct habits are acquired. This could aid in the maintenance of health throughout life and help to avoid obesity. Special attention should be given to improving the dietary habits of overweight and obese children and adolescents.

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*Printed in Great Britain*