INTRODUCTION

Childhood obesity is a growing public health concern, with many countries reporting an increase in rates over the last two to three decades [Margarey et al., 2001; Ogden et al., 2002; World Health Organization (WHO), 2003]. In Australia, the number of overweight children increased from approximately 10% in 1985 to 16% in 1995, and the number of obese children from approximately 1% in 1985 to 5% in 1995 (Margarey et al., 2001).

The increase in the prevalence of obesity in children is believed to be partly attributable to an increase in time spent watching television (Robinson, 1998). Adiposity in children has been associated with television viewing in several studies (Andersen et al., 1998; Robinson, 1998; Robinson, 1999; Crespo et al., 2001). An increase in television viewing results in a reduced energy expenditure through inactivity and an increased consumption of food, in response to food advertising and more opportunities for snacking (Andersen et al., 1998; Robinson, 1999; Ebbeling et al., 2002). Australian children aged between 5 and 12 years watch television regularly [Australian Bureau of Statistics (ABS), 2001], on average 2–3 h per day (AC Nielsen, 2001).
exact proportion of this viewing time that Australian children spend watching commercial channels is not known; however, for the Australian population it is estimated to be ~82% of non-pay television viewing time (AC Nielsen, 2001).

There has been much concern regarding food advertising during children’s television viewing hours, both in Australia and internationally. A survey of advertising to children in 13 countries reported that Australia has the highest number of television food advertisements per hour (Dibb, 1996). The majority of foods advertised during children’s television viewing hours are low in nutrient density and conflict with current recommendations for a healthy diet (Dibb, 1996; Hill and Radimer, 1997; Lewis and Hill, 1998; Byrd-Bredbenner and Grasso, 1999; Hammond et al., 1999; Wilson et al., 1999; Sustain, 2001; Hastings et al., 2003).

Previous Australian studies indicate that television advertisements for foods high in fat and/or sugar make up anywhere between one-half to just under three-quarters of all food advertisements (Choice, 1990; Hill and Radimer, 1997). These studies reported that fast food restaurant and/or confectionery advertisements are the most advertised food product categories on Australian television during children’s programs or viewing times (Choice, 1990; Hill and Radimer, 1997; Young Media Australia, 1997).

Children are vulnerable to food messages portrayed through television advertisements, with food advertising affecting the choices and amounts of foods consumed (Woodward et al., 1997; Hitchings and Moynihan, 1998; Bar-on, 2000; American Academy of Pediatrics, 2001; Borzekowski et al., 2001; Hastings et al., 2003).

Australian recommendations for healthy eating state that foods high in fat and sugar should contribute to only a very small proportion of the total diet (Commonwealth of Australia, 1998). The National Nutrition Survey (ABS, 1997) found that only one-third of children aged between 4 and 11 years had eaten fruit or fruit products, and >20% of children less than 12 years of age had not eaten vegetable products the day prior to interview. Amongst children between 2 and 11 years of age, consumption of fruit and fruit products decreased with increasing age, most noticeably for boys, whom between the ages of 4 and 11 years consumed more sugar products and dishes than fruit products and dishes.

More recent information with respect to Australian children’s diets is not available, but recent data in New South Wales (NSW) revealed similar results in terms of inadequate fruit and vegetable consumption by children (NSW Department of Health, 2002). There are no national data available for fast food or take-away food consumption, but in NSW, 30% of children aged 0–12 years eat two or more servings of hot chips each week and two-thirds of adolescents eat one to three meals from take-away food outlets each week (Schofield et al., 1999; Centre for Epidemiology, 2002).

Previous Australian studies involved viewing videotaped advertisements broadcast during and/or before and after children’s television programs, which has the advantage of determining the number and nature of different promotional food messages within advertisements (Choice, 1990; Dibb, 1996; Hill and Radimer, 1997; Young Media Australia, 1997). However, this is a method that restricts the amount of television advertising researchers can consider due to time and resource constraints, and hence these studies have been limited to television advertisements broadcast in one Australian capital city or on one Australian commercial television station, and only for limited time periods. There is a need to provide a current, broader description of Australian children’s exposure to television food advertisements.

The aim of this research was to describe the nature and frequency of food advertising during children’s television viewing hours for commercial television stations in the five largest Australian cities. We also aimed to determine whether confectionery and fast food restaurant advertisements were more likely to be broadcast during designated children’s programs and popular programs amongst 5–12 year olds than during adults’ programs on Sydney television stations.

METHODS

Food advertising on Australian television during children’s viewing hours

Data were purchased from AC Nielsen, an international market research company, which detailed all television advertisements broadcast during children’s viewing hours [Monday–Friday, 6:30–7:30am, 9–9:30am and 3–4:30pm; and
Saturday–Sunday, 7–11:30am] on 15 television stations in Sydney, Melbourne, Adelaide, Perth and Brisbane. Data were collected from Sunday 26th May 2002 to Saturday 1st June 2002. The total time monitored for the first study period was ~26 h per television station, 390 h in total.

The principal researcher classified advertisements according to the types of food they were promoting. Eighteen food categories were developed (Table 1) based on the five core food groups for nutritional requirements and ‘extra’ foods as outlined in the Australian Guide to Healthy Eating, which describes healthy diet patterns for children, adolescents and adults (Commonwealth of Australia, 1998). Decisions made with respect to food categories were also based on categories used in previous Australian studies (Hill and Radimer, 1997; Young Media Australia, 1997) and on consultation with nutrition and television food advertising experts [K. Mehta (Chairperson, Coalition for Food Advertising to Children (CFAC), and Lecturer, Department of Nutrition and Dietetics, Flinders University of South Australia), personal communication, 2002].

Confectionery and fast food restaurant advertising on Australian television

Data were also obtained from AC Nielsen with respect to confectionery and fast food restaurant television advertisements broadcast for the same 15 television stations during the hours of 6:30am–11pm for the period Sunday 23rd June 2002 to Saturday 29th June 2002. The total time monitored for this second study period was ~115.5 h per television station, 1732.5 h in total.

<table>
<thead>
<tr>
<th>Advertisement category by food group</th>
<th>Foods advertised (%)</th>
<th>Food advertising time (%)</th>
<th>Average no. of advertisements per hour per Australian television station (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy</td>
<td>10.3</td>
<td>8.2</td>
<td>0.85 (0.74–0.95)</td>
</tr>
<tr>
<td>Bread, cereals, rice, pasta</td>
<td>6.1</td>
<td>6.5</td>
<td>0.51 (0.35–0.66)</td>
</tr>
<tr>
<td>Core foods combined</td>
<td>5.8</td>
<td>5.7</td>
<td>0.47 (0.31–0.64)</td>
</tr>
<tr>
<td>Baby food</td>
<td>4.9</td>
<td>6.9</td>
<td>0.41 (0.28–0.53)</td>
</tr>
<tr>
<td>Meat, fish, poultry</td>
<td>0.9</td>
<td>1.3</td>
<td>0.08 (0.004–0.150)</td>
</tr>
<tr>
<td>Fruit and vegetables</td>
<td>0.1</td>
<td>0.1</td>
<td>0.01 (0.00–0.02)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>28.1</td>
<td>28.6</td>
<td>2.3 (2.1–2.5)</td>
</tr>
<tr>
<td>Food groups (high in fat/sugar)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confectionery</td>
<td>16.6</td>
<td>15.1</td>
<td>1.37 (0.90–1.84)</td>
</tr>
<tr>
<td>Fast food restaurants</td>
<td>13.0</td>
<td>15.4</td>
<td>1.07 (0.66–1.48)</td>
</tr>
<tr>
<td>Cakes, biscuits, muesli bars</td>
<td>5.5</td>
<td>5.6</td>
<td>0.46 (0.14–0.78)</td>
</tr>
<tr>
<td>High-fat/-sugar spreads</td>
<td>5.3</td>
<td>4.9</td>
<td>0.44 (0.23–0.64)</td>
</tr>
<tr>
<td>Breakfast cereals</td>
<td>5.1</td>
<td>5.7</td>
<td>0.42 (0.28–0.56)</td>
</tr>
<tr>
<td>(&gt;20% sugar)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sugared drinks</td>
<td>2.8</td>
<td>2.7</td>
<td>0.23 (0.07–0.39)</td>
</tr>
<tr>
<td>Frozen/fried potato products</td>
<td>2.0</td>
<td>1.4</td>
<td>0.17 (0.09–0.24)</td>
</tr>
<tr>
<td>Juice</td>
<td>1.8</td>
<td>2.3</td>
<td>0.15 (0.07–0.24)</td>
</tr>
<tr>
<td>Savoury crisps and pastries</td>
<td>1.5</td>
<td>1.4</td>
<td>0.13 (0.06–0.19)</td>
</tr>
<tr>
<td>Desserts</td>
<td>0.1</td>
<td>0.1</td>
<td>0.01 (0.00–0.02)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>53.7</td>
<td>54.7</td>
<td>4.4 (3.5–5.4)</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recipe helpers</td>
<td>6.2</td>
<td>6.7</td>
<td>0.51 (0.40–0.63)</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>12.0</td>
<td>9.9</td>
<td>0.99 (0.73–1.24)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>18.2</td>
<td>16.7</td>
<td>1.5 (1.2–1.8)</td>
</tr>
</tbody>
</table>

Notes:

- Australian data represent Sydney, Melbourne, Adelaide, Perth and Brisbane.
- Includes breakfast cereals with <20% sugar.
- Does not include fruit or vegetable juice.
Confectionery and fast food restaurant advertising during designated children's programs, and the television programs most watched by 5- to 12-year-olds in Sydney

For Sydney only, we compared confectionery and fast food restaurant advertising data during children's and adults' television programs. Children's and adults' programs were defined according to program classification and content, as described by the television stations. Using data provided by OzTam, the official source of television audience measurement data in Australia, we also included the top 20 programs watched by 5- to 12-year-old viewers during the study week as children's programs. The total time monitored for the three Sydney television stations during this study period was 346.5 h.

All data were analysed using SAS version 8.1 (SAS Institute, Inc., 1999–2001) Excel2000 (Microsoft Corporation) and a confidence interval (CI) analysis statistical package (Gardner, 1989).

RESULTS

Food advertising on Australian television during children's viewing hours

Overall, food advertisements accounted for 31.1% of all advertisements broadcast on Australian metropolitan television stations during the study period. During the monitored time slots over the study period, there was an average of 26.6 (95% CI = 25.5 to 27.6) advertisements per hour. There were 8.2 food advertisements per hour for each station, which accounted for an average of 3 min of food advertising per hour per station (Table 2).

The weekday afternoon time slot had the largest proportion of food advertisements (37%) and the greatest number of food advertisements per hour for each station, which accounted for an average of 3 min of food advertising per hour per station (Table 2).

Table 2: The average number of advertisements per hour per Australian metropolitan television station for the period 26/05/02 to 1/06/02

<table>
<thead>
<tr>
<th>Advertisement</th>
<th>Average number of advertisements per hour per Australian television station (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weekday morning</td>
</tr>
<tr>
<td>Non-food advertisements</td>
<td>15.0 (14.2–15.8)</td>
</tr>
<tr>
<td>Food advertisements</td>
<td>4.4 (2.9–6.0)</td>
</tr>
<tr>
<td>Community service announcements</td>
<td>0.1 (0.0–0.2)</td>
</tr>
<tr>
<td>Non-commercial advertisements</td>
<td>0.2 (0.1–0.4)</td>
</tr>
</tbody>
</table>

*aAustralian data represent Sydney, Melbourne, Adelaide, Perth and Brisbane.*
broadcast during children’s viewing hours. During the weekday and weekend period, fast food restaurant advertisements were most heavily broadcast during the pre- and post-dinner period (4–8pm), accounting for 52.1% of all fast food advertisements broadcast during the week. Confectionery was also heavily advertised in this pre- and post-dinner period on weekdays, accounting for 46.1% of all confectionery advertisements for the week.

Confectionery and fast food restaurant advertising during designated children’s programs, and the television programs most watched by 5- to 12-year-olds in Sydney

Designated children’s programs and programs popular amongst children aged between 5 and 12 years accounted for a smaller proportion of all programs than adult programs. Approximately half of all confectionery (53.4%) and fast food restaurant (50.1%) advertisements were broadcast during children’s programs in Sydney. There were on average nearly three times as many confectionery advertisements and twice as many fast food restaurant advertisements per hour during children’s television programs than during adult television programs [confectionery: adult’s programs, 0.4 per hour per television station (95% CI = 0.1–0.5); children’s programs, 1.1 per hour per television station (95% CI = 0.0–3.1); fast food restaurant: adult’s programs, 1.0 per hour per television station (95% CI = 0.0–2.2); children’s programs, 2.2 per hour per television station (95% CI = 0.0–6.2)].

**DISCUSSION**

Consistent with previous findings in Australia and internationally, this study found that approximately half of the food advertisements broadcast during children’s viewing hours were for high-fat or high-sugar foods, with the most advertised food categories being confectionery and fast food restaurants, and the least advertised being fruit and vegetables (Choice, 1990; Dibb, 1996; Hill and Radimer, 1997; Young Media Australia, 1997; Hammond et al., 1999). Our study has demonstrated that if an Australian child watched the average of 2.5 h/day of commercial television, they would be exposed to 11 advertisements for foods high in fat and/or sugar per day, with the majority of those being for confectionery or fast food restaurants. The message of food advertising where these foods are disproportionately promoted compared with other foods such as fruit and vegetables contradicts public health messages and guidelines, and undermines public health and parenting efforts to encourage healthy eating (Sustain, 2002). The findings of this study, which considered food advertising during children’s viewing times and compared fast food and confectionery advertising during children’s and adults’ programs, is consistent with international study findings and suggests that there is a selective targeting of children by promoters of unhealthy foods (Sustain, 2002). This is important, given that a substantial proportion of Australian children are not consuming an adequate diet for health (ABS, 1997) and that the rate of obesity is increasing amongst Australian children (Margarey et al., 2001).

Difficulties in obtaining data on television food advertising has meant that previous Australian studies were limited to commercial television stations in one capital city only and for a limited time period (Choice, 1990; Dibb, 1996; Hill and Radimer, 1997; Young Media Australia, 1997), limiting comparisons between findings. Although we were similarly limited in terms of time period due to resources, we used a less time-intensive method of obtaining television advertisement data, which enabled us to consider advertisements during children’s viewing times across five Australian capital cities, and confectionery and take-away food advertisements during children’s and adults’ programs in Sydney. Both study weeks were considered reasonably typical in terms of programming, with no public or school holidays, or special events. While it is difficult to know what variations exist in television advertising across different seasons, and comparison between findings is limited, the results across the various studies, regardless of time period, methods used and location, indicate that television food advertising to Australian children consistently promotes an unhealthy diet, in contrast to healthy eating guidelines.

It is important to recognise the assumptions made in this study about children’s viewing times and programs. The data used in the first part of this study were based on children’s television viewing times, as assumed by the company from whom we purchased the data. This did not allow us to estimate children’s level of exposure to advertisements broadcast outside these specified...
television viewing hours, which was also a limitation of previous studies using children’s viewing times as a measure (Choice, 1990; Young Media Australia, 1997; Hammond et al., 1999; Wilson et al., 1999). However, these assumptions of children’s viewing times are the same as those specified to commercial decision-makers when considering times in which to broadcast their television advertisements. This method should therefore accurately reflect the number and nature of advertisements aimed at children in Australia. For the second part of this study, which only considers Sydney television data, we used classifications of children’s programs made by the commercial television stations, which is similar to the method used in other studies considering data for one Australian city only (Dibb, 1996; Hill and Radimer, 1997). We had an additional advantage in also being able to determine the top 20 programs viewed by 5- to 12-year-olds during the study period, information also available to those making decisions regarding placement of food advertisements. This enabled us to capture the advertising broadcast during popular television programs watched by children that were not classified as such by the television station. These methods allowed us to determine whether confectionery and fast food restaurant advertisements are targeted at children.

Children need to be protected from the targeted promotion of unhealthy foods during children’s television programs [Dibb, 1996; Public Health Association of Australia (PHAA), 2002; Sustain, 2002]. While children’s television standards exist in Australia (Australian Broadcasting Authority, 1998), self-regulation of the advertising industry means that there is little protection for children from being the targets of promoters of unhealthy foods (CFAC, 2002; PHAA, 2003). Regulatory approaches exist in some countries to restrict advertising during children’s viewing hours (Dibb, 1996; Caraher, 2003). In Sweden, television advertising to children under the age of 12 years is banned on the basis that children of this age are unable to distinguish between program content and the persuasion of advertisements, a ban supported by the majority of Swedes (Dibb, 1996; Caraher, 2003). The food and advertising industries argue that the ban has failed to influence rising obesity rates in Sweden (Langlois et al., 2003); however, rates there are not rising as rapidly as in unregulated economies (Caraher, 2003).

Television watching and exposure to food advertising is clearly only one factor in a complex pattern of social and personal factors impacting upon the development of poor eating patterns and overweight and obesity in children (NSW Department of Health, 2002). Television viewing has been linked to diet and obesity, but it is not known whether this effect is due to food advertising on television, the sedentary nature of television viewing, or the increased amount of snacking that may occur whilst watching television (Hastings et al., 2003). There is no unequivocal evidence that television food advertising causes childhood obesity; however, there is sufficient indirect evidence to warrant consideration of its contribution to a causal effect on obesity as ‘probable’ (WHO, 2003). Research has already confirmed the influence of advertising on children’s choices and should not be underestimated (Dibb, 1996; Woodward et al., 1997; Center for Nutrition Policy and Promotion, 1998; Hitchings and Moynihan, 1998; Borzekowski et al., 2001; Sustain, 2002).

Experts in Australia have expressed valid concern with respect to the type of foods advertised on television during children’s viewing hours and have called upon the Australian Government to control food advertising during children’s viewing (PHAA, 2002; CFAC, 2003; Commercial Alert, 2004). CFAC has called for a ban in Australia on all food advertising during television programs where the viewing audience comprises a substantial proportion of children (Ashton et al., 2003). The UK has recognised the need for action and is making efforts to address the imbalance in television food advertising to children, an effort requiring collaboration between government, the food and advertising industries, schools, broadcasters, celebrities and others (Food Standards Agency, 2004).

In Australia, a government-led, independent review of the regulatory frameworks governing food advertising to children was called for at the conclusion of the NSW Childhood Obesity Summit (NSW Department of Health, 2003). Commercial Television Australia responded to community concerns by reviewing the Commercial Television Industry Code of Practice, in which the primary areas of change were related to advertising to children (CFAC, 2003). Public comment on the drafted code was sought, providing public health experts with the opportunity to review it (CFAC, 2003; PHAA, 2003). They have concluded that the changes provide no
additional protection for children against food advertising above what already exists within the inadequate Children’s Television Standards (CFAC, 2003), and a review of these standards has been called for (PHAA, 2003; National Obesity Taskforce, undated).

There is currently little protection for Australian children against television advertising of unhealthy foods, despite concerns voiced by public health professionals and the community at recent childhood obesity forums in Australia about: (i) the level and nature of food advertising to children (CFAC, 2002; Department of Human Services, 2002; NSW Department of Health, 2003); (ii) the surmounting evidence regarding the targeted promotion of unhealthy foods through television advertising to children and the influence of food promotion on children’s food preferences and consumption (Ashton et al., 2003; Hastings et al., 2003); (iii) advocacy efforts of public health professionals in Australia (CFAC, 2002; PHAA, 2002; Ashton et al., 2003; CFAC, 2003; PHAA, 2003; Commercial Alert, 2004); and (iv) strong calls for government intervention (WHO, 2003). If we are to translate evidence into policy, there is a need for further advocacy efforts.

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REFERENCES


Gardner (1989) Confidence Interval Analysis Package, BMJ.


