Television food advertising in Singapore: the nature and extent of children’s exposure

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SUMMARY

Television advertising is an effective medium for reaching young children and influencing their food choice. Studies have shown that messages conveyed by food advertisements are rarely consistent with healthy eating messages. With the increasing purchasing power of children, food companies are focusing on children as lucrative target audiences. Extensive marketing of energy-dense, nutrient-poor foods to children potentially contributes to the ‘obesogenic’ environment. This study aims to determine the degree and nature of food advertisements that Singaporean children are exposed to on television. Ninety-eight hours of children’s television programmes broadcast by free-to-air stations were recorded and analysed. Advertisements with the intent of selling and sponsorships for programmes were included. Foods advertised were considered healthy if they met the criteria of the Healthier Choice Symbol in Singapore. Of the 1344 advertisements and sponsorships identified, 33% were for food. Of the food advertisements, 38% were considered healthy, while 57% were not. Candy, confectionery and fast food advertisements accounted for 46% of total food advertisements. Significantly more unhealthy food advertisements were screened on weekends compared with weekdays (p < 0.001). This is the first content analysis of television advertisements in Singapore and the results of this study provide background data on the extent of food advertising that children in Singapore are exposed to. Consistent with other countries, unhealthy food advertisements continue to dominate children’s television programmes. This study suggests that Singaporean children are exposed to high levels of advertising for unhealthy foods. The study provides a baseline against which measures aimed at reducing children’s exposure to television food advertising can be evaluated.

Key words: children; television; food advertising; obesity

INTRODUCTION

Childhood obesity is a growing global epidemic (Lobstein et al., 2004). It is estimated that ~10% of the world’s school-aged children are overweight or obese (Lobstein et al., 2004). The prevalence of overweight, though higher in the economically developed countries, is also rising in developing countries (Lobstein et al., 2004). In Australia, the prevalence of overweight and obesity doubled between 1985 and 1995 (Margarey et al., 2001), and it is estimated that one-quarter of Australian children are overweight or obese (Australian Government Department of Health and Ageing, 2008). The prevalence of overweight and obesity in children in the USA is ~17% (National Centre for Health Statistics, 2006), while in Singapore, the prevalence of overweight school-aged population was 9.5% in 2006 (Ministry of Education Singapore, 2007). In 2008, 18.4% of Singapore’s population was aged 14 years and below (Singapore Department of Statistics, 2009).
There are many health risks associated with childhood obesity. They include increased risks of dyslipidaemia, hypertension, insulin resistance, hepatic-gastrointestinal disturbances, sleep apnoea and orthopaedic complications (Must and Strauss, 1999; Lobstein et al., 2004). Childhood obesity is shown to persist into adulthood, along with its associated health risks (Must and Strauss, 1999; Lobstein et al., 2004). Apart from the risks associated with childhood overweight and obesity, poor nutrition also results in dental caries, low bone density (Coalition on Food Advertising to Children, 2007) and poor psycho-social and mental health (Van de Weyer, 2005), such as poor academic achievements and behavioural problems.

The causes of overweight and obesity are multi-factorial, with genetic, behavioural and environmental factors as their main determinants (Carter, 2006; Lake and Townshend, 2006). Studies on children’s energy consumption patterns have shown an upward trend in industrialized as well as in less-industrialized countries such as China, India and the South Americas and are largely caused by increased consumption of energy-dense foods and beverages (Dalmeny et al., 2003; Carter, 2006). Singapore, a developed country in the Pacific region has a consumption pattern similar to western countries, with increasing caloric contribution from fat (Lee and Gourley, 1987). In Australia, a study conducted among students aged 5–16 years showed that while there was an increase in the prevalence of physical activity participation from 1997 to 2004, a large proportion of students spent >2 h a day on sedentary activities, such as television viewing and playing computer games (Booth et al., 2006). In Malaysia and South Korea, the proportion of children who spend >8 h a day watching television during vacations were 30 and 10%, respectively (De Cruz et al., 2004). A lifestyle combining low physical activity and high energy intake may lead to overweight and obesity.

Television viewing is one of the contributing factors of obesity. It reduces energy expenditure by displacing physical activity and increases consumption resulting in excess energy intake (Robinson, 1999). Harris et al. (Harris et al., 2009) demonstrated that food advertising was able to prime automatic eating behaviours and increase children’s consumption by 45%. Television viewing exposes children to food commercials promoting energy-dense nutrient-poor foods and encourages the consumption of these foods (Caroli et al., 2004; Halford et al., 2004; Lake and Townshend, 2006; Taveras et al., 2006). Borzekowski and Robinson (Borzekowski and Robinson, 2001) found that brief exposures to a 10- to 30-s food commercial can influence children’s food preferences. A systematic review conducted by Hastings et al. (Hastings et al., 2006) also showed that advertising to children does exert an impact on their food knowledge, preferences and behaviours. In a study conducted by Arnas (Arnas, 2006), ~50% of children asked their parents to purchase the products that they had seen on television advertisements. More importantly, the effects of television viewing on food choices may have long-term effects that persist into young adulthood (Barr-Anderson et al., 2009).

Although parents are typically responsible for the food intake of the family, Dixon and Banwell (Dixon and Banwell, 2004) showed that children exert considerable influence over family diets. In a survey conducted by Consumers International (2004), >50% of parents surveyed reported that their children exerted an important influence on purchase decisions. In addition, parents from India, Malaysia and Pakistan also reported ‘child’s demand’ as the main reason for buying a particular product (De Cruz et al., 2004).

Evidence has shown that there is a need to protect young children from unhealthy food advertisements because they lack the ability to fully understand the persuasive intent of advertisements and are less able to judge the advertisements critically (Lobstein and Dibb, 2005). A study conducted by Oates et al. (Oates et al., 2002) showed that although very young children can differentiate between advertisements and programmes on television, their understanding of the persuasive nature of advertising are not reached until the age of 8 at the very earliest.

Content analysis of food advertisements conducted in the USA, Australia, New Zealand, Britain and Turkey has consistently shown that children are exposed to large quantities of food products that are energy-dense and nutrient-poor (Kotz and Story, 1994; Dibb and Harris, 1996; Hill and Radimer, 1997; Lewis and Hill, 1998; Hammond et al., 1999; Zuppa et al., 2003; Harrison and Marske, 2005; Neville et al., 2005; Arnas, 2006; Chapman et al., 2006; Gantz et al., 2007). In Asia, the level of food advertising
varied from 25 to 75% of total food advertisements screened during children’s programmes (De Cruz et al., 2004). The level of food advertising was lowest in South Korea (25%) and highest in Pakistan and Philippines (50–75%). The studies have found that confectionery, fast food and sweetened breakfast cereals were the most heavily advertised products (Hammond et al., 1999; Zuppa et al., 2003; Harrison and Marske, 2005; Neville et al., 2005; Arnas, 2006). Advertisements for healthy foods such as fruit and vegetables were either absent or rare (Dibb and Harris, 1996; Hill and Radimer, 1997; Hammond et al., 1999; Zuppa et al., 2003; Arnas, 2006). When food advertisements were compared with healthy eating guidelines from their respective countries, it was found that these advertisements contradicted healthy eating messages, and consequently gave children an inaccurate impression of what foods were ‘good’ to eat (Kotz and Story, 1994; Zuppa et al., 2003; Harrison and Marske, 2005).

This is of great concern because dietary habits developed during early childhood are important determinants of food intake patterns in adulthood (Kelder et al., 1994).

Currently, there is a paucity of data about television food advertisements targeted at children in Singapore. Recognizing the influence such advertisements can exert on the food preferences of our young, it is timely and important that this study seeks to:

(i) assess the extent and nature of the food advertisements screened on children’s television channels in Singapore, and

(ii) compare the nutritional quality of the foods advertised against the prevailing nutritional standards.

**MATERIALS AND METHODS**

Television programmes classified as ‘children’ or ‘info-ed’ were recorded and included in the study. Info-educational programmes seek to meet informational and educational needs of viewers and viewership targeted is dependent on the channel airing the show (personal communication). As info-educational programmes were obtained from a channel dedicated to children viewing, the targeted age group for such programmes were assumed to be 12 and under. All programmes were recorded from key ‘free-to-air’ broadcast stations in Singapore, which screened children’s programmes in English, Mandarin, Malay and Tamil. The classification of programmes was obtained from the Media Corporation of Singapore (personal communication) as well as verification through the local newspaper listings. Apart from ‘free-to-air’ broadcast stations, children’s programmes are also available on ‘Pay TV’. Children’s programmes from ‘paid’ sources were not included in this study.

The study initially intended to use 57 h of info-ed and children’s programmes recorded during the third week of August 2007. However, this period coincided with the visit of the ‘Hi-5 Circus Stage Show’, a children’s group from Australia, resulting in an extraordinary volume of advertisements promoting this show. To account for the potential skewing effect of the circus stage show advertisements on data collection, an additional 41 h of info-ed and children’s programmes recorded in the first week of August 2007 were also included. This resulted in a total of 98 h of info-ed and children’s programmes for analysis. Programmes from the second week of August 2007 were excluded as it coincided with a national public holiday and the researchers considered that programmes screened during that week might not be reflective of a typical broadcasting week. The two weeks of recorded programmes were during school term. Programmes from the various channels were recorded concurrently onto DVDs. A summary of the recording hours for each week is shown in Table 1, and the specific recording hours for each day and channel are shown in Table 2.

The programmes were viewed by a primary observer, and all non-programme content (advertisements) screened were identified and analysed. Only advertisements with the intent of selling were included in the analysis. Station promotions (non-programme segments that promote upcoming programmes of the station/other stations), station recruitments (non-programme segments that recruit contestants for upcoming station programmes) and newsbreaks were excluded. Sponsorships for programmes were included in the analysis if they contained explicit messages indicating that the programmes were being sponsored by a particular company or product (e.g. ‘proudly brought to you by . . .’).
All identified food advertisements and sponsorships identified were analysed and coded according to:

- Day of the week (weekdays or weekends);
- Time slot (morning, afternoon or evening);
- Food category (categories used were based on Singapore’s Healthy Diet Pyramid and the Healthier Choice Symbol (HCS) guidelines);
- Whether the food product had the HCS logo and;
- Whether the food product met the HCS criteria as recommended by the Health Promotion Board, Singapore (HPB) if it did not have the logo (e.g. for cultured milk drink/yogurt drink, the fat content must be ≤1 g/100 g and the total sugar content must be ≤10 g/100 g as recommended by the HPB).

The HCS, launched in 1998, is one of the several nutrition education initiatives introduced by HPB. It provides point-of-sale information to Singaporeans on healthier food choices while at the supermarket or shops (HPB, 1998). Food products carry the HCS logo if they meet the nutritional guidelines set by HPB. However, application for HCS is not mandatory. Food products that carry the HCS are generally lower in fat, saturated fat and sodium, and higher in dietary fibre and calcium compared with products from the same food category.

For those advertised food products that do not carry the HCS logo, their nutrition information was obtained through supermarket visits to facilitate comparisons with the HCS Nutritional Guidelines. For food categories (e.g. breakfast cereals) where the HCS Nutritional Guidelines were under review, criteria from CHOICE Food for Kids (CHOICE Food for Kids 2007) were used. CHOICE is an independent consumer organization in Australia that provides parents with information on food products to help them make informed food choices. Under the CHOICE Food for Kids criteria, food items with sugar content ≥15 g/100 g and drinks with sugar content of ≥7.5 g/100 g were

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**Table 1:** Summary of recording hours for each week

<table>
<thead>
<tr>
<th>Week and dates of recording</th>
<th>Details of recording</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st week of August 2007</td>
<td>41 h of info-ed and children’s programmes were recorded.</td>
</tr>
<tr>
<td>31 July (Tuesday), 3 August (Friday), 4 August (Saturday),</td>
<td>School term</td>
</tr>
<tr>
<td>5 August (Sunday)</td>
<td></td>
</tr>
<tr>
<td>2nd week of August 2007</td>
<td>No recording due to national public holiday</td>
</tr>
<tr>
<td>3rd week of August 2007</td>
<td>57 h of info-ed and children’s programmes were recorded.</td>
</tr>
<tr>
<td>13 August (Monday), 14 August (Tuesday), 15 August (Wednesday),</td>
<td>School term</td>
</tr>
<tr>
<td>17 August (Friday), 18 August (Saturday), 19 August (Sunday)</td>
<td>High number of advertisements promoting visit of Hi-5 Circus Stage Show</td>
</tr>
</tbody>
</table>

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**Table 2:** Recording hours for each day and television channel

<table>
<thead>
<tr>
<th>Date/TV channel</th>
<th>English</th>
<th>Mandarin</th>
<th>Malay</th>
<th>Tamil</th>
<th>Duration (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 July 2007 (Tuesday)</td>
<td>9 am–6.30 pm</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>6.30 pm–7 pm</td>
</tr>
<tr>
<td>3 August 2007 (Friday)</td>
<td>9 am–6.30 pm</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>6.30 pm–7 pm</td>
</tr>
<tr>
<td>4 August 2007 (Saturday)</td>
<td>8 am–4 pm</td>
<td>8 am–11 am</td>
<td>—</td>
<td>—</td>
<td>6.30 pm–7 pm</td>
</tr>
<tr>
<td>5 August 2007 (Sunday)</td>
<td>8 am–1 pm</td>
<td>8 am–11 am</td>
<td>—</td>
<td>—</td>
<td>6.30 pm–7 pm</td>
</tr>
<tr>
<td>13 August 2007 (Monday)</td>
<td>9 am–6.30 pm</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>7 pm–8 pm</td>
</tr>
<tr>
<td>14 August 2007 (Tuesday)</td>
<td>9 am–6.30 pm</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>7 pm–8 pm</td>
</tr>
<tr>
<td>15 August 2007 (Wednesday)</td>
<td>9 am–6.30 pm</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>7 pm–8 pm</td>
</tr>
<tr>
<td>17 August 2007 (Friday)</td>
<td>9 am–6.30 pm</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>7 pm–8 pm</td>
</tr>
<tr>
<td>18 August 2007 (Saturday)</td>
<td>a 8 am–11 am</td>
<td>7 pm–8 pm</td>
<td>—</td>
<td>—</td>
<td>4</td>
</tr>
<tr>
<td>19 August 2007 (Sunday)</td>
<td>8 am–1 pm</td>
<td>8 am–11 am</td>
<td>b</td>
<td>1 pm–2 pm</td>
<td>9</td>
</tr>
</tbody>
</table>

Total number of recording hours 98

aNo recording was done due to technical error.
bUsual children’s programme was replaced by the National Day Rally telecast.
considered unhealthy. Foods that did not meet the HCS criteria and/or the CHOICE Food for Kids criteria were thus considered unhealthy.

In addition to the HCS initiative, HPB also has the Healthier Dining Programme which aims to increase the availability of healthier dishes in restaurants and cafes. Through this non-mandatory programme, HPB works with eating outlets to develop healthier dishes or modify the recipes of existing dishes to ensure that they contain less oil, salt and sugar. Some dishes also contain more fruit and vegetables. For this study, the HCS logo (for food products) and the Healthier Dining Programme (for retail food services such as restaurants) will be collectively referred to as HCS as they represent healthier food choices available to the public.

A second observer was given the same coding form and instructions to code a 10% sample of the total duration of recordings. Intra-coder reliability was also assessed with the primary coder re-coding 10% of the total duration of recordings. Inter- and intra-coder reliability were calculated using the following formula (Zuppa et al., 2003):

\[
\frac{\text{Number of agreements} \times 100}{\text{Number of agreements} + \text{number of disagreements}}
\]

Statistical analyses were conducted using SPSS for Windows (SPSS Inc, Chicago, SPSS for Windows, Version 15.0.1.1 2001). Descriptive statistics were used to explore the extent and nature of the television food advertisements, while Pearson’s \( \chi^2 \) tests were performed to test for any differences that existed between the proportion of food advertisements screened during weekdays and weekends.

RESULTS

A total of 98 h of television programmes were recorded over the 2 weeks in August 2007. Thirty-four hours of weekend programmes and 64 h of weekday programmes were recorded. Eight hours of programmes on the third Saturday of August 2007 were not recorded owing to technical error.

Inter-coder reliability was found to be 90%, while intra-coder reliability was 95%.

A total of 1344 advertisements and sponsorships were identified, of which 693 were advertisements and 651 were sponsorships. Subsequent analyses combined both sponsorships and advertisements without distinguishing between them. Thirty-three per cent (\( n = 441 \)) of the advertisements were for food or retail food outlets, resulting in an average of 4.5 food advertisements per hour.

Candy and confectionery were the most frequently advertised foods, accounting for 34\% (\( n = 150 \)) of the total food advertisements (Table 3). Retail food outlets and milk were the next most frequent food advertisements, accounting for 26\% (\( n = 115 \)) and 14\% (\( n = 63 \)) of total food advertisements, respectively. Among the advertisements for retail food outlets, advertisements for fast food accounted for 45\% (\( n = 52 \)) of total retail food outlet advertisements.

Advertisements involving the use of free gifts accounted for 1.2\% (\( n = 16 \)) of total food advertisements.

Proportion of food advertised that met the criteria for the HCS and/or CHOICE Food for Kids

Of the 441 food advertisements, 39\% (\( n = 171 \)) met the criteria for the HCS/CHOICE (37\% carried the HCS logo and 2\% of them did not) and 56\% (\( n = 247 \)) of the food advertisements did not. The most frequently advertised food products that met the HCS/CHOICE criteria were liquid milk and retail food services, followed by cultured milk raw rice, tonic (e.g. chicken essence) and coffee/tea. The most heavily advertised food products that did not meet the HCS/CHOICE criteria were candy/confectionery, followed by fast food, potato crisps, breakfast cereal, soft drinks, biscuits/crackers/cookies and malted drinks. The HCS/CHOICE criteria were not applicable for the remaining 5\% (\( n = 23 \)) of food advertisements, which were primarily made up of infant formula advertisements.

Comparison of the levels of food advertising during different time slots

The average number of food advertisements screened per hour varied according to day and time as shown in Table 4. More food advertisements were screened on weekday afternoons (5.4 advertisements per hour) compared with weekday mornings (0.9 advertisements per
hour; \( \chi^2 = 140, p < 0.001, 1 \text{ df} \). On the weekends, more food advertisements were screened in the mornings (8.4 advertisements per hour) compared with afternoons and evenings (4.4 and 1.5 advertisements per hour, respectively; \( \chi^2 = 111, p < 0.001, 1 \text{ df} \)).

The pattern of unhealthy food advertisements screened per hour followed a similar trend (Figure 1). On weekdays, the average number of unhealthy food advertisements was lowest in the morning (0.4 advertisements per hour) and subsequently increased in the afternoon and evening (2.7 and 2.4 advertisements per hour, respectively; \( \chi^2 = 42, p < 0.001, 2 \text{ df} \)). On Saturday, the morning time slot (4.4 advertisements per hour) had the highest number of unhealthy food advertisements and subsequently decreased in the afternoon and evening (3.3 and 0.7 advertisements per hour, respectively; \( \chi^2 = 46, p < 0.001, 2 \text{ df} \)). A similar trend was observed on Sundays, which also had the highest average number of unhealthy food advertisements in the morning (4.9 advertisements per hour; \( \chi^2 = 106, p < 0.001, 2 \text{ df} \)).

### Table 3: Frequency, percentage of food advertisements and proportion of unhealthy foods advertised by food groups screened during 98 h of children’s television programmes. Total number of food advertisements recorded was 441

<table>
<thead>
<tr>
<th>Food category</th>
<th>Frequency of food advertisement (%)</th>
<th>Percentage of foods advertised that did not meet the HCS criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candy/confectionery</td>
<td>150 (34.0)</td>
<td>100</td>
</tr>
<tr>
<td>Retail food outlets</td>
<td>115 (26.1)</td>
<td>45</td>
</tr>
<tr>
<td>Liquid milk</td>
<td>63 (14.3)</td>
<td>0</td>
</tr>
<tr>
<td>Potato chips/crisps</td>
<td>25 (5.7)</td>
<td>100</td>
</tr>
<tr>
<td>Cultured milk drink/yogurt drink</td>
<td>22 (5.0)</td>
<td>0</td>
</tr>
<tr>
<td>Rice/grains</td>
<td>16 (3.6)</td>
<td>0</td>
</tr>
<tr>
<td>Infant formula</td>
<td>14 (3.2)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Breakfast cereal</td>
<td>11 (2.5)</td>
<td>100</td>
</tr>
<tr>
<td>Tonic (e.g. chicken essence, birds’ nest)</td>
<td>9 (2.0)</td>
<td>0</td>
</tr>
<tr>
<td>Soft drinks (carbonated and non-carbonated) and cordial</td>
<td>6 (1.4)</td>
<td>100</td>
</tr>
<tr>
<td>Coffee/tea</td>
<td>5 (1.1)</td>
<td>0</td>
</tr>
<tr>
<td>Biscuits/crackers/cookies</td>
<td>3 (0.7)</td>
<td>100</td>
</tr>
<tr>
<td>Maltered drinks (e.g. Milo, Horlicks)</td>
<td>2 (0.5)</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>441 (100)</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4: Average number food advertisements screened per hour

<table>
<thead>
<tr>
<th>Day type/time slots</th>
<th>Morning (8 a.m. to 12 noon)</th>
<th>Afternoon (12 noon to 4 p.m.)</th>
<th>Evening (4 p.m. to 8 p.m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekdays</td>
<td>0.9</td>
<td>5.4</td>
<td>2.5</td>
</tr>
<tr>
<td>Weekends</td>
<td>8.4</td>
<td>4.4</td>
<td>1.5</td>
</tr>
</tbody>
</table>

### Fig. 1: Comparison of the average number of unhealthy food advertisements aired per hour during different time slots and days of the week.

**Comparison of the levels of food advertising on weekends and weekdays**

There were significantly more food advertisements screened on weekends compared with weekdays (\( \chi^2 = 74, p < 0.001, 1 \text{ df} \)). Weekends accounted for 54\% \( n = 239 \) of the total food advertisements, an average of 7.0 food advertisements per hour. Weekdays on the other hand, accounted for 46\% \( n = 202 \) of the total food advertisements, an average of 3.2 food advertisements per hour.

The level of unhealthy food advertisements was also higher on weekends compared with weekdays (\( \chi^2 = 41, p < 0.001, 1 \text{ df} \)). There was an average of 1.8 unhealthy food advertisements screened per hour during weekdays; while an
average of 4.0 unhealthy food advertisements were screened per hour during weekends.

DISCUSSION

Television advertising has been shown to be an effective medium for reaching young children and influencing their food choices (Hastings et al., 2006). Studies have also provided evidence that messages conveyed by food advertisements are not consistent with healthy eating messages (Zuppa et al., 2003; Harrison and Marske, 2005). With the increasing purchasing power of children (De Cruz et al., 2004; Dixon and Banwell, 2004), it is not difficult to understand why children remain a key target for increased sales. For every US $1 spent by the WHO to improve nutrition, US $500 is spent by the food industry to promote processed foods (Millstone and Lang, 2003). The heavy marketing of energy-dense nutrient-poor foods to children is considered to contribute to the ‘obesogenic’ environment (Swinburn et al., 1999; Lake and Townshend, 2006).

The present study showed that 33% of the advertisements screened were for food and retail food outlets, a level similar to that in Australia as shown by the studies conducted by Chapman et al. (Chapman et al., 2006) and Zuppa et al. (Zuppa et al. 2003). When compared with other Asian countries, the level of food advertising in Singapore was found to be higher than in South Korea (25%), but lower than India (40–50%), Pakistan, Philippines and Malaysia (50–75%; De Cruz et al., 2004).

This study analysed broadcast data during school terms, avoiding public holidays and school holidays, during which it might be expected that different advertisements would be shown. As Singapore is a multi-ethnic society, inclusion of programmes of various languages from multiple channels ensured that the study investigated a representative sample of programmes and advertisements that Singaporean children would be exposed to.

Candy and confectionery as well as fast food advertisements accounted for approximately half (46%) of all food advertisements. This finding was again similar to previous content analyses (Zuppa et al., 2003; Neville et al., 2005; Chapman et al., 2006) conducted in Australia. This study also found that there were no food advertisements promoting fruit and vegetables which was similar to previous studies (Zuppa et al., 2003; Neville et al., 2005; Arnas, 2006) conducted in Turkey and Australia.

More than half (57%) of the foods advertised did not meet the criteria for healthy food for this study (HCS criteria and/or CHOICE Food for Kids). The proportion of unhealthy food advertisements found in this study was consistent with the previous studies conducted in Australia, the USA and Britain where the proportion of unhealthy food advertisements ranged from 55 to 83% (Hill and Radimer, 1997; Lewis and Hill, 1998; Zuppa et al., 2003; Harrison and Marske, 2005; Neville et al., 2005; Chapman et al., 2006). However, results of this comparison should be treated with caution owing to differences in the categorization of healthy and unhealthy foods among countries. Although the HCS uses precise definitions for healthy and unhealthy foods, some of its nutritional criteria were different from definitions used in other studies. For example, fruit juice was classified as a non-core/unhealthy food in Australian studies (Zuppa et al., 2003; Neville et al., 2005; Chapman et al., 2006) and in the multi-national study conducted by Dibb and Harris (Dibb and Harris, 1996), fruit juice was considered a soft drink. However, under the HCS criteria, 100% fruit juice without added sugar is considered a healthier choice. Such differences may limit the comparison of results across countries.

The number of unhealthy food advertisements screened per hour varied considerably across different time slots. The results of this study showed that the average number of unhealthy food advertisements per hour on weekdays was higher in the afternoons, when children were more likely to be home from school. On weekends, the levels of unhealthy food advertisements were highest during the morning timeslots, a pattern also noted by Chapman et al. (Chapman et al., 2006). A study conducted in Malaysia found that weekends had longer periods of high target audience density compared with weekdays (Karupaiah et al., 2008). The authors of this study termed this period with high viewership density as ‘prime time’. The ‘prime time’ for children’s programmes were significantly higher on the weekends (4.61 ± 0.33 h) compared with weekdays (1.89 ± 0.18 h; Karupaiah et al., 2008).

The provision of free gifts with purchase of items is a strategic form of advertising strategy,
which is widely used by companies to increase their sales (Dalmeny et al., 2003). This study also found local food companies using this as an advertising strategy. For example, soft drinks were offered free of charge with purchase of raw rice. The association of soft drinks with rice not only acts as a form of unhealthy food exposure, but it also potentially confused children’s perception about healthy and unhealthy foods.

Another advertising strategy involving the use of free gifts found in this study was the promotion of free toys with the purchase of food products. This strategy has been employed by various fast food companies to encourage brand loyalty and repeated purchases (Dalmeny et al., 2003). In this study, the promotion of free toys was not limited to fast food outlets, as it was also adopted by soft drink companies.

An interesting finding from this study was the use of school sponsorships as an advertising strategy. For example, a fast food company sponsored primary school visits where science experiments were conducted. Such visits may not promote fast food directly; however, they may influence children’s food choices by associating the activity with the brand and/or icon. This form of food promotion is akin to similar initiatives by other fast food companies to promote walking as a form of physical activity.

Television advertisements in Singapore are regulated by the Advertising Standards Authority of Singapore (ASAS) and are guided by the Singapore Code of Advertising Practice (SCAP; ASAS, 2003). The SCAP has specific regulations that govern the types of advertisements that can be targeted at children and young people. However, there is only one regulation that highlights which ‘advertisements should not actively encourage children to eat excessively throughout the day or to replace main meals with confectionery or snacks foods’ (ASAS, 2003). While none of the advertisements were found to breach this regulation, they are nevertheless considered to be problematic by primarily promoting unhealthy foods and using strategies that are influential and potentially confusing to children. Currently, there are no regulations in SCAP that specifically address these problems in advertising to children.

This is the first content analysis of advertisements aired during children’s television programmes conducted in Singapore. The study provides useful baseline data on the extent and nature of television food advertising our children are exposed to. Effectiveness of interventions which aim to lower the level of exposure can be evaluated against such data.

More research needs to be done in this area especially as there is currently no data regarding children’s television viewing habits in Singapore. With information from such studies, any relationship between unhealthy food advertising and television viewing habits of children can be further looked into. In addition, comparisons of the level of advertising can also be made between children and adult viewing times to determine if industries specifically target children’s viewing timeslots. With the increasing economic affluence of Singapore, inclusion of data from pay television, and other forms of media such as the Internet and children’s magazine should also be included for future studies.

One of the limitations of this study was that the period during which data were recorded coincided with the promotion of the ‘Hi-5 Circus Stage Show’. The Show was heavily advertised and this might have diluted the actual level of food advertisements aired. A second limitation was that only children’s programmes were included in this study. Therefore, the findings may not be truly reflective of the complete extent of food advertisements children are exposed to as children may also have access to non-children programmes as well. Evidence from other countries showed that peak television viewing time for children are not during designated children times (Morley et al., 2008).

The 98 h of television programmes analysed may not be sufficient to provide a representative snapshot of the current level of food advertisements that Singaporean children are exposed to. The number of programmes analysed was much less than similar studies conducted in other countries (Neville et al., 2005; Chapman et al., 2006). As information regarding the level of television viewing by children is currently lacking, future studies should look into this. Data on the degree of media reach of advertisements in Singapore are lacking and should be explored in future studies.

**CONCLUSION**

Children today are exposed to food advertising via many different media, with television being just one of these. This study has provided an overview of the nature and extent of children’s
television food advertising in Singapore. It found that the extent of television food advertising targeted at children on television is comparable with that in other developed countries. Other forms of food marketing to children such as the Internet, children’s magazines and in-school food promotions need to be studied for a more in-depth understanding of the impact of media exposure on children’s dietary habit as part of efforts to minimize its influence on the young.

Globally, there is a move to develop self-regulatory or legislative initiatives to protect the young from the indiscriminate marketing of food and beverages (WHO, 2010). The findings of these studies will shed light to guide the development of such initiatives.

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