



PRACA ORYGINALNA / ORIGINAL PAPER

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**The caloric value of television food advertising targeted
at Polish children**

**Wartość kaloryczna telewizyjnych reklam żywności skierowanych
do dzieci w Polsce**

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STRESZCZENIE

Otyłość wśród dzieci i młodzieży jest coraz większym problemem zdrowotnym w XXI wieku. Reklamy żywności o wysokiej wartości energetycznej i ubogiej w składniki odżywcze mogą wpływać na wybory konsumentów.

Celem badania była analiza wartości kalorycznej wszystkich reklamowanych produktów żywnościowych, skierowanych do dzieci w trzech stacjach telewizyjnych.

Metody: Nagrano wszystkie programy emitowane w trzech kanałach telewizyjnych (TVP1, Polsat, Cartoon Network), w ciągu czterech dni każdego tygodnia (przez okres od września do października). Emitowane reklamy zostały przeanalizowane w celu określenia liczby reklamowanych produktów żywnościowych. Następnie zakupiono reklamowane produkty i obliczono ich wartość energetyczną.

Wyniki: Średnia wartość kaloryczna reklamowanych produktów żywnościowych, skierowanych do dzieci wahała

ABSTRACT

Obesity among children and adolescents is a growing health problem in the twenty-first century. The marketing of energy-dense nutrient-low foods via television advertising likely affects consumer choice. Successful advertising can give added value to products and may influence the viewer's perception regarding the nutritional value and energy content of the advertised food.

The aim of the study was to analyze the caloric content of all food-products advertised to children on three television stations.

Methods: All programmes broadcast on three television channels (TVP1; Polsat and Cartoon Network) were recorded on four days of each week for a 24-hour period. Advertisements were analyzed to determine the number of food. The advertised products were then purchased and the calorific value was recorded.

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Udział współautorów / Participation of co-authors: A – przygotowanie projektu badawczego/ preparation of a research project; B – zbieranie danych / collection of data; C – analiza statystyczna / statistical analysis; D – interpretacja danych / interpretation of data; E – przygotowanie manuskryptu / preparation of a manuscript; F – opracowanie piśmiennictwa / working out the literature; G – pozyskanie funduszy / obtaining funds

Artykuł otrzymano / recived: 3.01.2016 | Zaakceptowano do publikacji / accepted: 24.02.2016

Piotrowicz A, Łuszczki E, Sobek G, Wyszyńska J, Podgórska-Bednarz J, Mazur A. *The caloric value of television food advertising targeted at Polish children*. *Medical Review* 2016; 14 (1): 8–15. doi: 10.15584/medrev.2016.1.1

się od 1700 kcal/ dzień w stacji Cartoon Network do 33000 kcal/ dzień w telewizji Polsat. Reklamowaną żywność stanowiły głównie przekąski i produkty typu fast-food, o wysokiej zawartości tłuszczów i cukru. Średnia wartość kaloryczna reklamowanego produktu żywnościowego wyniosła 500 kcal na 100g.

Wnioski: w reklamach telewizyjnych skierowanych do dzieci, promuje się głównie żywność o wysokiej wartości energetycznej, ubogą w składniki odżywcze. Taka promocja może wpływać na zachowanie konsumentów i tym samym wpływać na nadmierne spożycie wysokokalorycznych produktów żywnościowych.

Słowa kluczowe: otyłość u dzieci; reklamy telewizyjne; wysokokaloryczne produkty

Introduction

Obesity among children and adolescents is a growing health problem in the twenty-first century. It is crucial to remember that up to 70% of adolescents who are obese are likely to become adults who are obese [1, 2]. Though the development of obesity is influenced by a number of factors, one of the main drivers is considered to result from a chronic positive energy balance where energy in excess of that expended is stored by the organism [3, 4]. As currently understood, excessive energy intake, a reduction in energy expenditure and an increase in sedentary behaviors are the main factors contributing to the emergence of overweight and obesity. Obesity is a risk factor for dyslipidemia, metabolic dysfunction [5] and musculoskeletal impairment [6] and increases the risk of chronic diseases such as cardiovascular disease, osteoarthritis type 2 diabetes [7–9] and certain types of cancer and mental disorders [10].

Mass media plays a role in promoting unhealthy food to citizens. Marketing of unhealthy products to vulnerable groups such as children is of significant public health concern. The number of food advertisements targeting young viewers may reach up to 40000 per year with a substantial percentage of total advertising being devoted to energy-rich nutrient-low 'junk food' such as chips, pizza, sweets [11].

The relationship between media and childhood obesity was explored in the 1980's [12] and was confirmed by a number of studies since then [13–16]. Evidence suggests that advertisements targeting children are constructed in a very specific way. For instance, advertisements often over-emphasize the advantages of advertised products and capitalize on the young viewers inability to resist persuasion. Similarly, the widespread access to junk-foods formulated to be tasty and fragrant can affect children choice [17].

The aim of the study was to analyze and calculate the caloric value of advertisements on three television stations in Poland.

Results: The average caloric value of advertising for children ranged from 1700 kcal per day on the Cartoon Network to 33000 kcal per day on Polsat TV. The main ads targeting children were for snack and fast-food products with high levels of fat and sugar and an average caloric value of 500 kcal per 100g.

Conclusions: TV advertising aimed at child viewers promotes mainly energy-dense and nutrient-poor products. The promotion of such products may have an impact on consumer behavior and in turn influence the intake of excessive calories.

Keywords: Childhood obesity; Television advertising; High-calorie products

Methods

Television programming from the following networks were analyzed: TVP 1 (the biggest and state-owned television company in Poland), Polsat (the leading Polish commercial television station) and Cartoon Network (one of the most popular channels for children). All programmes were recorded using a DVD recorder (Panasonic DMR-EH68) on four days: Wednesday, Thursday (two weekdays), Saturday and Sunday (two weekend days) of each week between September 21st 2011 and October 9th 2011 for a 24 hours period (to provide a total of 288 h for analysis).

Subsequently advertisements were analyzed to determine the number of food advertisements in addition to the number which targeted children. All advertisements on Cartoon Network station were classified as directed for children. At the other two stations advertisements transmitted half an hour before and half hours after children's programs were considered as targeting children.

Food products advertised to children were purchased and caloric value per 100 g was recorded from the nutritional labels.

Statistics: Analysis were conducted using Statistica 10.0 and Microsoft Office Excel 2010. Descriptive results were presented as percentages whereas the Chi-square and Cramer's V tests were used to explore differences in advertisements between TV channels. A p-value of <0.05 was considered to be statistically significant.

Results

The caloric value/100g of the foods advertised each day are presented in Table 1.

It results from the study that statistically significant results ($p < 0.05$) related to advertised drinks, candies, fast food, dairy products and other products (which include: oil, margarine, fish, ketchup, jelly, noodles, chewing gum); (see Figure 1)

Disparities regarding the caloric value of advertised products were also determined by the amount of advertisements issued by individual stations (see Figure 2).

The number of advertisements recorded during the study period presented Table 2.

The differences in calorific value of the advertised products between the programs shown in Table 3.

There were statistically significant differences regarding the advertisements for sugar-sweetened beverages between Polsat and TVP 1 (p-value 0.0142) whereby Polsat promoted products with a calorific value of 748,5 kcal by advertising sweet drinks. The number of calories was higher for Polsat than for TVP 1. The comparison of TVP1 and Cartoon Network (p-value was 0.2321), Polsat

and Cartoon Network (p-value 0.2153) showed no significant differences.

Statistically significant differences in the caloric value of advertising sweet products emerged between TVP 1 – Cartoon-Network (p-value 0.00522), and between Polsat and Cartoon-Network (p-value <0.001). Most advertisements related to sweets were broadcasted by Polsat (reaching the average of 13771,75 kcal). The difference between Polsat and TVP 1 was not significant (p-value 0,11063).

Statistically significant differences in the caloric value of fast food and chips' advertising were noticed between

Tab. 1. The total calorific value of products advertised to children

| | Polsat | Polsat (average) | TVP1 | TVP1 (average) | Cartoon Network | Cartoon Network (average) |
|-----------|------------|------------------|------------|----------------|-----------------|---------------------------|
| Wednesday | 21636 kcal | 18177,5 kcal | 20661 kcal | 19131 kcal | 2229 kcal | 1980 kcal |
| Thursday | 14719 kcal | | 17601 kcal | | 1730 kcal | |
| Saturday | 31393 kcal | 32469,5 kcal | 12500 kcal | 12728 kcal | 1957 kcal | 1860 kcal |
| Sunday | 33546 kcal | | 12956 kcal | | 1767 kcal | |

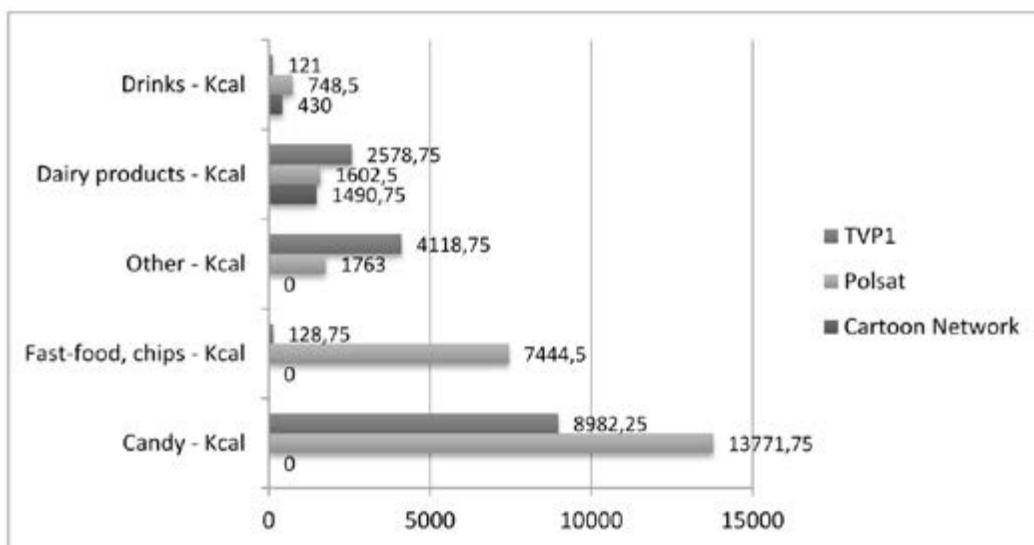


Fig. 1. The average calorific value of advertised products within one day

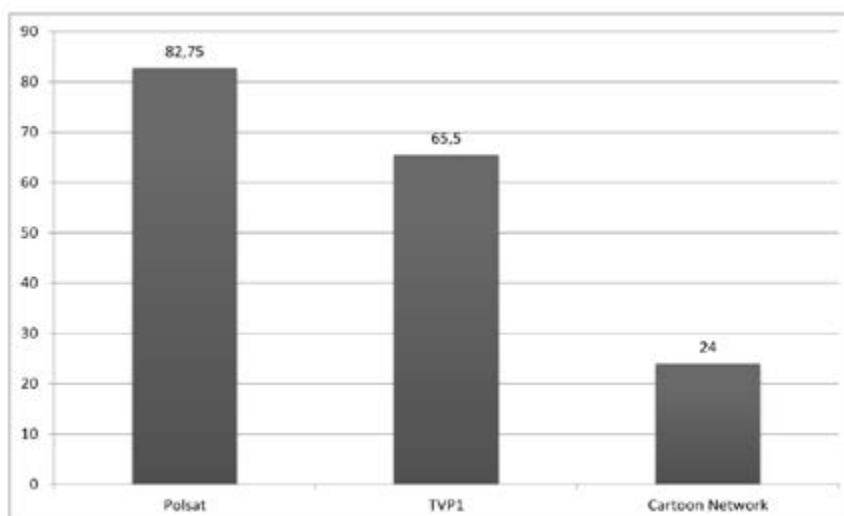


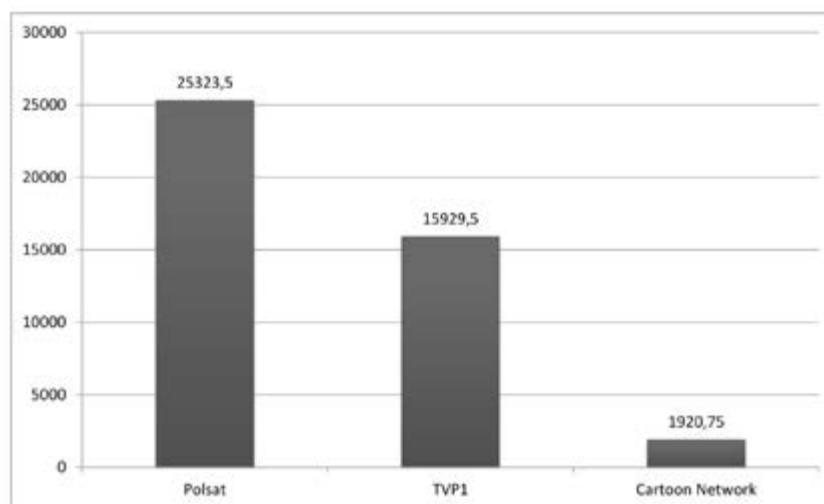
Fig. 2. The mean number of ads in various stations in the analyzed period of time

Tab. 2. The number of advertisements recorded during the study period (September 21st 2011 and October 9th 2011)

| | Polsat | TVP1 | Cartoon Network |
|------------------|-----------------|-----------------|------------------------|
| Wednesday | 74 adds | 75 adds | 31 adds |
| Thursday | 50 adds | 85 adds | 22 adds |
| Saturday | 97 adds | 53 adds | 22 adds |
| Sunday | 110 adds | 49 adds | 21 adds |
| Total | 331 adds | 262 adds | 96 adds |

Tab. 3. Statistically significant differences for the caloric values

| Food Type | Stations | The average calorific value of advertised products within one day [kcal] | p-value (P<0.05)* |
|---------------------------|-------------------|---|-----------------------------|
| Sugar-sweetened beverages | Polsat/ TVP1 | 748,5/ 121 | 0.0142* |
| | TVP1/ Cartoon N | 121/ 430 | 0.2321 |
| | Polsat/ Cartoon N | 748,5/430 | 0.2153 |
| Sweet products | Polsat/ TVP1 | 13771,75/ 8982,25 | 0,11063 |
| | TVP1/ Cartoon N | 8982,25/ 0 | 0.00522* |
| | Polsat/ Cartoon N | 13771,75/0 | <0.001* |
| Fast-Food and chips' | Polsat/ TVP1 | 7444,5/ 128,75 | <0.000139* |
| | TVP1/ Cartoon N | 128,75/ 0 | 0.992100 |
| | Polsat/ Cartoon N | 7444,5/ 0 | <0.000156* |
| Other type of food | Polsat/ TVP1 | 1763/ 4118,75 | 0.08516 |
| | TVP1/ Cartoon N | 4118,75/ 0 | 0.00535* |
| | Polsat/ Cartoon N | 1763/ 0 | 0.21348 |

**Fig. 3.** The average daily calorific value of products advertised to children

Polsat and Cartoon Network (p-value <0.000156), as well as Polsat and TVP 1 (p-value <0.000139). Data show that Polsat broadcasted the vast majority of such commercials, with the average caloric value of 7444,5 kcal. The comparison of TVP 1 and Cartoon Network (p-value 0.992100) was not statistically significant.

For the other type of food, statistically significant differences occurred between TVP 1 and Cartoon-Network (p-value 0.00535) with and an average of 4118,75 kcal presented by TVP1. The statistics proved no significant differences between Polsat – Cartoon Network (p-value 0.21348), and Polsat – TVP 1 (p-value 0.08516).

To sum up, the highest-calorie food products were advertised on Polsat channel. This applies to such products as: sweets, fast food, and chips. The second place took TVP1, and Cartoon Network the third one when it comes to the amount of calories in food ads targeted at children.

Statistically significant differences for the caloric values of advertised products were seen between: Polsat and Cartoon Network (p-value 0.0148) where the average was 23402,75 kcal/ day for Polsat, and TVP1 – Cartoon Network (p-value <0.001) where advertising prevalence on TVP1 reached an average of 14008,75kcal /day. For



Fig. 4. Food advertising pyramid in children's TV prime time (average)

TVP 1 and Polsat there were no statistically significant differences (p-value 0.0926).

Polsat had issued the average number of daily spots on the caloric value of 25323 kcal. However, TVP1 reached 15929 kcal and Cartoon-Network had 1920 kcal (Figure 3).

The most frequently advertised products were sweets followed by dairy products. Figure 4 describes the number of advertisements dedicated to each food group.

Discussion

Alarming increasing prevalence of obesity in children and adults in recent years cannot be explained only by genetic changes [18]. Important in this regard seem to be environmental factors, including health behaviors and knowledge of children and young people about healthy lifestyles [19].

Firstly storming advertising food products has an impact on the diet of the population. It have been proved that consumer choices (mainly food) have their base in the desire to have the goods advertised, which after all is due to the specifics of the ad itself is the effect intended [20].

Especially food marketing and advertisement plays a meaningful role in shaping children's nutritional eating habits, weight status, and knowledge. Exposure to food advertising is associated with nutritional mistaken belief: the greater the exposure to food advertising, the greater the probability that unhealthy items will be judged as nutritious and healthy [21–23]. Several experiments show short-term effects on children's attitudes and their preferences for food [24, 25]. Time of television exposure is positively correlated with children's skills to correctly identify product brands [26] and with their consumption of advertised brands [27]. Numerous scientists are reporting, the media play a significant role in the development of overweight and obesity through effects on social behavior. Media offer addressed to children and

young people is increasing. Television programs, thematic channels, computer games, games consoles, websites – it is targeted offers for children and young people, perceived as a typical consumer [28].

Survey data indicate that television viewing begins at a very young age [29], and has raised as a function of the new expansion in programming targeted especially at infants [30]. More than half (59%) of children below 2 years of age watch television on an average day [31] whereas the American Academy of Pediatrics recommending before the age of 2 years no media exposure [32].

Furthermore Federal Trade Commission reported that children aged 2 to 17 years see roughly 5500 food advertisements in television per year, or about 15.1 per day [33]. Commercials for food products have long been a essential in children's television programming, and the displayed items are generally low-nutrient, high fat and sugar candies, snacks, and fast food [34, 35].

A methodical review of the published research evidence connecting television exposure with adiposity was reported in 2006 by the Institute of Medicine (IOM) [36]. The IOM classify more than 60 studies conducted over approximately the past 20 years that converged to present a small, statistically significant relationship between television exposition and child obesity. Studies were appraise for methodological strength, and the superior the study's rigor, the superior the likelihood that it showed a meaningful relationship between these variables. Since the IOM review was reported, numerous large-scale epidemiologic studies have emerged to further corroborate this relationship [37–41].

Data from cross-sectional and long-term studies bring the same pattern of results. One review of research described that, in 18 of 22 studies, more hours of media exposure caused increased weight over time [42].

Moreover studies of advertising reported that obesogenic food in television targeted at youth [34]. One of them presented that 2 out of every 3 cereals advertised to children fail to meet nutritional standards with regard to added sugar [43]. Almost all (98%) food advertisements viewed by children and 89% seen by adolescents are for products high in sugar, fat, or sodium [44]. In comparison, healthy food and drink that should be part of a regular diet are practically never advertised to children [45].

Furthermore food marketers invest almost \$2 billion yearly in advertisement for children, which is the largest share devoted to television advertisements [46]. Committee on Nutrition of Children and Youth Committee of Human Nutrition, Polish Academy of Sciences, has developed nutritional standards for the population of Polish children. For example, boys aged by 13–15 with moderate physical activity a day should consume about 3000 kcal of energy in the form of supplements. The girls of the same age about 2400 kcal. The daily intake of individual nutrients such as: proteins, fats, carbohydrates and minerals must also be within certain standards [47].

This study shows that the commonly advertised food products are confectionary products fast food, chips, sweet fizzy drinks. This phenomenon is particularly in advertisements for children. The average caloric value ranges from 1700 kcal per day in advertising on the channel Cartoon Network, to as many as 33000 kcal in Polsat TV.

It may seem right argument, saying that demand dictates supply, so if sweets, fast food products are preferred by consumers in response to the demand of market makers widen the range and launch advertising campaigns of its products in the media. All food, which scientists estimate as conducive to the formation of obesity, were present in advertisements on our consumer market, especially on television, it confirmed my research.

In addition, an Australian Centre For Health Promotion in 2006 report analyses of food advertisements by program, time channel, audience, food type show that there is accurate targeting of food advertisements, and particularly high sugar/high fat food advertisements to children. Intensive food advertisements protrude during specific programs, times and channels, impacting on children's exposure to these advertisements [48].

Importantly, they noticed that during weekend was a greater proportion of advertisements for children from

the high sugar/high fat category when compared to days from Monday to Friday. The time period with the highest proportion of high sugar/high fat advertisements was weekend in morning [48].

Present study indicates for a similar phenomenon in the commercial station Polsat channel, which clearly amount advertised food products aimed at children, grew on Saturday and Sunday – averaging 32469,5 kcal per day – and week 18177,5 kcal per day.

The caloric value of advertising is huge, our research included a few days for individual television stations, and the results are alarming.

Similarly research carried out in the Arizona (USA). The majority (72%) of food ads targeting children promote foods of low nutritional quality [35].

In conclusion the face of the sheer volume of all manner of advertising directed at children, seems to be a reasonable order of some European countries prohibit direct advertising to children under 12 years of age. This raises the question of whether a specific “kindermarketing” [49] should be examined in terms of ethics and the impact on the health of future generations.

Conclusions

TV advertising can have an impact on consumer behavior already in the youngest recipients. Children are a vulnerable group of particularly advertisers actions.

Advertised unhealthy foods may have an impact on the development of obesity in children in Poland.

Key Messages

1. Obesity among children and adolescents is a growing health problem in the twenty-first century.
2. The marketing of energy-dense nutrient-low foods via television advertising likely affects consumer choice.
3. Successful advertising can give added value to products and may influence the viewer's perception regarding the nutritional value and energy content of the advertised food.
4. TV advertising aimed at child viewers promotes mainly energy-dense and nutrient-poor products.
5. The promotion of such products may have an impact on consumer behavior and in turn influence the intake of excessive calories

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