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RESEARCH ARTICLE / *ARAŞTIRMA MAKALESİ*

Food and Beverage Content on YouTube Videos Targeting Children: A Descriptive Analysis

Çocukları Hedefleyen YouTube Videolarında Yiyecek ve İçecek İçerikleri: Tanımlayıcı Bir Analiz

Tülin Çoban[1], Volkan Gün[2], Sevda Betül Bozkurt[3], Busenur Sarıduman[4], Büşra Güleçer[5], Cristina Cebanova[6], Ebru Ocak[7], Elif İkiz[8], Mert Kara[9], Merve Nur Uluğ[10], Muhammed Taha Uludağ[11], Hilal Özcebe[12]

[1]Hacettepe University Faculty of Medicine, Department of Public Health, Ankara, Turkiye
[2]Sarıveliler District State Hospital, Karaman, Turkiye
[3]Çiftlik District State Hospital, Nigde, Turkiye
[4]Kagithane District Health Directorate, Istanbul, Turkiye
[5]Sile District State Hospital, Istanbul, Turkiye
[6]Ankara, Turkiye
[7]Merzifon Karamustafapasa District State Hospital, Amasya, Turkiye
[8]Reşadiye District State Hospital, Tokat, Turkiye
[9]Ankara, Turkiye
[10]Polatlı District State Hospital, Ankara, Turkiye
[11]Gemerek District State Hospital, Sivas, Turkiye
[12]Hacettepe University Faculty of Medicine, Department of Public Health, Ankara, Turkiye

ORCID ID: T.Ç. 0000-0003-1665-129X; V.G. 0000-0001-7137-4526; S.B.B. 0000-0002-7355-3103; B.S. 0000-0001-6778-301X; B.G. 0000-0002-1345-7099; C.C. 0000-0003-3425-2372; E.O. 0000-0001-7598-847X; E.İ. 0000-0003-2532-1954; M.K. 0000-0002-8368-3497; M.N.U. 0000-0003-4854-1706; M.T.U. 0000-0002-2243-4905; H.Ö. 0000-0002-0918-8519

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ABSTRACT

Objective: Research shows that most of the food advertisements in YouTube videos belong to unhealthy and processed foods and this platform lacks control. In this research, it is aimed to evaluate the advertisements in the most viewed videos on the most watched children's YouTube channels in terms of food and beverage content.

Methods: The five most-watched videos (345 videos in total) on each of the 69 channels, selected by ratings on YouTube, were watched. The videos and all the advertisements shown during videos were assessed according to the determined criteria through the data collection form prepared by the researchers.

Results: No ad was displayed in 21.2% of the videos watched. The subjects of advertisements in the videos were mostly "mobile games", "computer games" and "toys" (27.9%; 22.7%; 13.9%, respectively). Of the videos, 7.4% were about food, 2% drinks, and 0.1% both. The most advertised foods were chocolate, chewing gum, and cake. Of the 345 videos analyzed, 28.1% contained food and 6.1% beverages, regardless of the advertisements. In 76.2% of the videos, there were no messages about nutrition and food. There were some characters eating healthily/encouraging a healthy diet in 12.5% of all videos and some characters

ÖZ

Amaç: Araştırmalar, YouTube videolarındaki gıda reklamlarının çoğunun sağlıksız ve işlenmiş gıdalara ait olduğunu ve bu platformun kontrolden yoksun olduğunu göstermektedir. Bu araştırmada en fazla izlenen çocuklara yönelik YouTube kanallarında, en fazla görüntülenen videolarda, yer alan reklamların yiyecek ve içecek içerikleri açısından değerlendirilmesi amaçlanmaktadır.

Yöntem: YouTube'da izlenme sıklıklarına göre seçilen 69 kanalın her birinde en çok izlenen beş video (toplam 345 video) izlenmiştir. Videolar ve videolar sırasında gösterilen tüm reklamlar, araştırmacılar tarafından hazırlanan veri toplama formu ile belirlenen kriterlere göre değerlendirilmiştir.

Bulgular: İzlenen videoların %21,2'sinde reklam gösterilmemişti. Videolarda en fazla yer alan reklam konuları "mobil oyunlar", "bilgisayar oyunları" ve "oyuncaklar" (sırasıyla %27,9; %22,7; %13,9) idi. Reklamların %7,4'ü yiyecekler, %2'si içecekler, %0,1'i ise her ikisi hakkındaydı. En fazla reklamı yapılan yiyecekler çikolata, sakız ve kekti. Araştırmada izlenen tüm videoların %28,1'i reklamdan bağımsız olarak yiyecek; %6,1'i içecek içeriyordu. Videoların %76,2'sinde beslenme ve gıda ile ilgili herhangi bir mesaj yoktu. Tüm videoların %12,5'inde sağlıklı beslenen/sağlıklı beslenmeyi

Corresponding Author/Sorumlu Yazar: Tülin Çoban **E-mail:** tulincoban87x@gmail.com

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eating unhealthily/encouraging an unhealthy diet in 11.3%. While 46.2% of the fairy tale/story-themed videos contained characters and messages encouraging healthy eating, the videos about computer games did not include messages about nutrition.
Conclusion: There is a need for regulations regarding advertising on digital platforms. It is also vital to monitor the industry to make visible the current threats to childhood obesity.

Keywords: Advertisement, child, food industry, social marketing, video

teşvik eden; %11,3'ünde ise sağlıksız/sağlıksız beslenmeyi teşvik eden karakterler vardı. Masal/hikâye temalı videoların %46,2'sinde sağlıklı beslenmeyi teşvik eden karakter ve mesajlar bulunurken, bilgisayar oyunları ile ilgili videolarda beslenme ile ilgili mesajlara yer verilmemişti.
Sonuç: Dijital platformlarda reklam verme konusunda düzenlemelere ihtiyaç bulunmaktadır. Ayrıca, çocukluk çağı obezitesi ile ilgili mevcut tehditleri görünür kılmak için endüstrinin izlenmesi hayati önem taşımaktadır.

Anahtar Kelimeler: çocuk; gıda endüstrisi, reklam; sosyal pazarlama; video

INTRODUCTION

Technological developments have increased the interaction of children with digital media (1,2). Children use YouTube extensively. In the United Kingdom, YouTube was the most-used video-sharing platform among children aged 5-15 for watching content in 2020 (87%) and 58% of children said that they watched videos on YouTube every day (3). In Australia 72% of 10–12-year-olds (4) and in the United States of America (USA) 85% of 13–17-year-olds reported regular YouTube use in 2018 (5).

In a recent study, it was estimated that children and adolescents saw food marketing an average of 30 and 189 times a week, respectively, in social media (6). Growing evidence from randomized controlled trials and systematic reviews reveals that food advertising has been linked to unhealthy eating habits via ads for high-calorie, low-nutrient food and beverages (7-14). Children are one of the main target groups of advertisers because they are very easy to convince and can strongly affect their families. These advertisements affect children's food preferences and consumption habits (8,9,12,13). Research also shows that most of the food advertisements in YouTube videos motivate children to consume unhealthy and processed foods and lack advertising warnings in content targeting children (15,16). Coates et al. found that school-aged children who viewed influencers promoting unhealthy snacks showed a significant increase in intake of unhealthy snacks and total calories compared with children who viewed influencers promoting nonfood items (17).

Considering these factors, in this research, it is aimed to evaluate the advertisements in the most viewed videos on the most watched children's YouTube channels in terms of food and beverage content.

MATERIALS AND METHODS

This study was carried out using channels broadcasting on the YouTube website. YouTube, a video hosting website established in 2005 in California, is the second most used social media platform in the world with 2 billion active users per month (18,19). It was aimed to make a descriptive evaluation, using a convenience sample, not to represent all YouTube content. YouTube channels that would be included in the study were selected in two ways. Fifty channels were selected by using an independent social media analysis website, *Socialblade.com,* which tracks and collects detailed statistics on YouTube channels such as the number of views or followers (20). Since there is a possibility that some channels with a high number of views may not be on this site, a search was conducted with some keywords (tale, toy, child) on YouTube, selecting the ranking criteria as "Most Popular" and 19 more channels were reached. On each of the 69 selected channels, the most viewed five videos (345 videos in total) were evaluated. The videos watched were in Turkish. Research data was collected between 7-11 December, 2020. To avoid the use of internet cookies, Yandex Browser (Yandex Inc., Russia) that had never been used before was installed onto computers, and "incognito" mode was used.

The videos were watched by 10 researchers. Through a data collection form created by the researchers; characteristics of the videos, the content and duration of the advertisements in the videos, at which minute the advertisement was shown and the healthy/unhealthy nutrition messages for children in the video were evaluated. The criteria of healthy and unhealthy nutrition were developed by using the National Nutritional Guideline of the Ministry of Health (21). Besides the nutritional guideline, the criteria of school canteens (*"The Nutrition Profile Model Usage Guidelines for Ads for Foods and Beverages Not Recommended for Children")* were taken to describe healthy and unhealthy food and drink (22). In order to minimize interobserver variation during data collection, a data collection guideline was created and a pilot study was performed. All the researchers evaluated two videos, and they compared their coding. They reviewed the guideline to minimalize the different coding. During data collection, each video was evaluated separately by two researchers. The two researchers again compared their coding, and they decided upon the final version of the coding of the video. The videos were evaluated by a content analysis method. Since the research was conducted with publicly available data and the research subject was not "human", ethics committee approval or institutional permission was not obtained.

Statistical analysis

The data were obtained as open-ended and then grouped to facilitate analysis. The number of subscribers, the number of views, and the duration of the videos were divided into 4 categories through their quartiles.

- For *"count of subscribers"*; the first quartile is 2,500,001 and above; the second quartile is 1,550,001 to 2,500,000; the third quartile is 657,001 to 1,550,000; the fourth quartile is 657,000 and less.

- For *"video views"*; the first quartile is 49,985,714 and above; the second quartile is 22,549,732 to 49,985,713; the third quartile is 6,154,778 to 22,549,731; the fourth quartile is 6,154,777 and less.
- For *"video duration"* the first quartile is 632 seconds and above; the second quartile is 350 to 631; the third quartile is 205 to 349; the fourth quartile is 204 and less.

The topics of the videos were grouped into 9 main themes: *"Games, toys, vlogs, cartoons, children's songs, computer games, fairy tales, education, and others."* "Vlogs (video blogs)" are created by people who video their daily lives (vloggers) and share content regularly (23). The subjects of the advertisements in the videos were categorized as *"mobile game, computer game, toys, food, beverages and others."*

Data analysis in the study was performed with the "Statistics Package for Social Sciences" (SPSS ver. 24.0). Descriptive statistics were stated as percentage, mean, standard deviation, median, quartiles, minimum-maximum values in the analyzes. The Pearson's Chi-square test was used for categorical data in comparisons between groups. Results with a type 1 error value of <0.05 were considered statistically significant.

RESULTS

Within the scope of the study, which evaluated a total of 345 videos watched on 69 channels on YouTube, the median number of subscribers of the channels examined was 1,550,000 (IQR=1,843,000; min-max=18,100-18,400,000); 23% of them had more than 2.5 million subscribers. The number of views of the videos varies between 135,612 and 884,525,516 (median=22,945,070; IQR=42,964,209) and 24.6% of the videos have been viewed more than 50 million times. Most of the videos watched (n=345) were mobile game, cartoon, and toy videos (respectively 22.9%, 19.4%, 18.8%) **(Figure 1)**.

No ad was displayed in 21.2% of the 345 videos watched. Of 271 videos with advertisements 46.1% had one ad, 23.6% had two ads, and 11.4% had five or more ads. There were 393 advertisements totally. Of all advertisements 7.4% (n=29) were about food, 2% (n=5) drinks, and 0.1% (n=2) both **(Table 1).**

Table 1: Characteristics of advertisements (ads) in videos analyzed on YouTube channels that produce content for children (December 2020)

The number of ads in the video watched (n=345)	n	%
Number of videos with advertisement	271	78.6*
1 advertisement	125	46.1
2 advertisements	64	23.6
3 advertisements	35	12.9
4 advertisements	17	6.3
5 and more advertisement	31	11.4
Number of videos without advertisement	74	21.4*
Subjects of advertisements in the videos (n=393)		
Mobile game	76	19.3
Computer game	62	15.8
Toys	38	9.7
Food	29	7.4
Beverages	5	1.3
Food/Beverages**	36	9.1
Other	180	45.8

* Percentages are based on the total number of videos (n=345); other percentages were taken over the number of advertisements (n=272).
**There was an advertisement including both food and beverages.

The food products marketed in 24 advertisements (66.6% of all food and beverage ads) were among the foods prohibited to be advertised (red category) according to the *"The Nutrition Profile Model Usage Guidelines for Ads for Foods and Beverages Not Recommended for Children"* published by the Ministry of

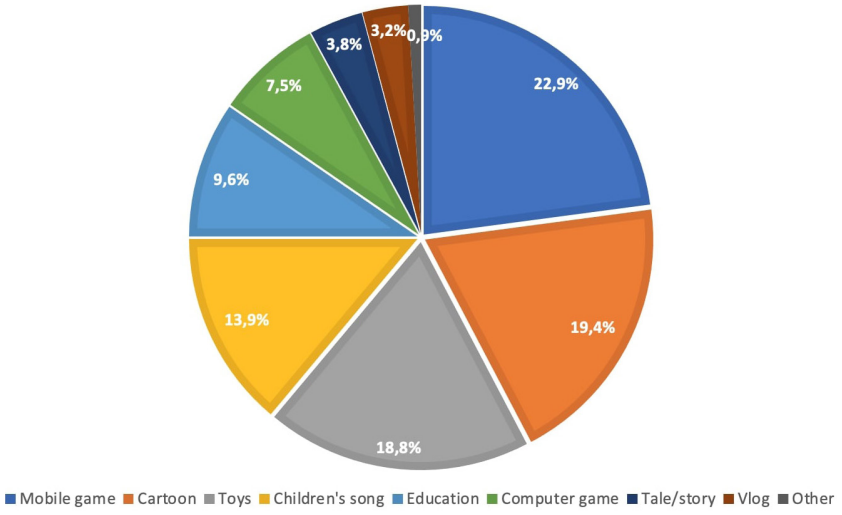


Figure 1: Distribution of videos according to their subjects

Health (22). Nearly all advertisements were full screen (97.2), half of them were in the first 10 seconds (45.9%), including music (91.9%), color (59.5) and fun activities (45.9%) **(Table 2).**

Of the 345 videos analyzed, 28.1% (n=97) contained food and 6.1% (n=21) beverages, regardless of advertisements. Figure-2 shows in how many videos the mentioned food or drink has been seen **(Figure 2).** There was "paid sponsorship" in 55 videos (17.7%). Of these, 14 (25.5%) were related to food and 2 (3.6%) were related to beverages**.**

In the quartile with the least number of views (p=0.018) and the longest duration (p=0.001), the percentage of food/beverage advertisements was the highest. In addition, statistically a significant relationship was found between the number of subscribers of the channels and the presence of food and beverage content regardless of advertisements in the videos (p=0.001), and the number of video views and the presence of food and beverage content regardless of advertisements in the videos (p=0.009) **(Table 3).**

Table 2: Distribution of food advertisements (ads) found in videos reviewed on YouTube channels producing content for children (December 2020)

Property	First Ad (n=30)		Second Ad (n=7)		Total (n=37)	
	n	%*	n	%*	n	%*
Location of the ad						
Full screen	29	96.7	7	100.0	36	97.2
Under the screen	1	3.3	-	-	1	2.8
Time (seconds) that the ad appeared						
10 and below	17	56.7	-	-	17	45.9
11-180	3	10.0	1	14.3	4	10.8
181-300	3	10.0	1	14.3	4	10.8
301 and over	7	23.3	5	71.4	12	32.4
Ad duration (seconds)						
16 and below	10	33.3	1	14.3	11	29.7
17-30	7	23.4	2	28.6	9	24.3
31-45	10	33.3	3	42.8	13	35.1
46 and over	3	10.0	1	14.3	4	10.8
Advertised food category**						
Chocolate	12	40.0	3	42.9	15	40.5
Beverages	4	13.3	1	14.3	5	13.5
Cake	3	10.0	1	14.3	4	10.8
Gum	3	10.0	1	14.3	4	10.8
Caterer/Food market	2	6.7	1	14.3	3	8.1
Crisps	2	6.7	-	-	2	5.4
Other***	5	16.7	-	-	5	13.5
Attractive characters						
Cartoon character	12	40.0	2	28.6	14	37.8
Peer child	11	36.6	3	42.8	14	37.8
Famous person	-	-	1	14.3	1	2.7
Fun activities	15	50.0	2	28.6	17	45.9
Music	28	93.3	6	85.7	34	91.9
Text	11	36.6	1	14.3	12	32.4
Subtitle	15	50.0	3	42.8	18	48.7
Vibrant colors	21	70.0	1	14.3	22	59.5

*In each variable, percentages were taken over n=30 for first ad, percentages for second ad over n=7 and for total n=37.
**In some advertisements, there are more than one type of food or beverages, percentages are based on the number of ads.
***Other: food supplement (n=1), dried nuts (n=1), sunflower seed oil (n=1), frozen food (n=1), cracker (n=1).

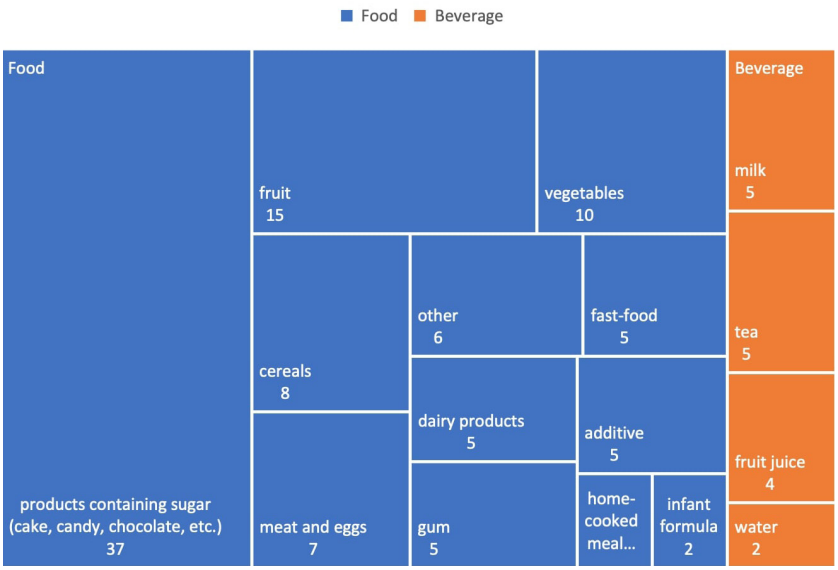


Figure 2: Distribution of food and beverages included in videos regardless of advertisements

* Some ads feature more than one food or drink. The numbers show in how many videos the mentined food or drink has been seen

The subject of 48.5% of the videos with food advertisements was "computer games". In 61.5% of the videos whose subject was "tale/story", in 48.5% of the videos whose subject was "education", in 45.5% of the videos whose subject was "vlog" had food/beverage content. While some characters encourage a healthy diet in 12.5% of all videos, some encourage an unhealthy diet in 11.3% of the videos. Thirty seven percent of the videos with no food and beverage advertising contained messages that encourage unhealthy eating. According to the subjective evaluations of the researchers, 13.5% of all videos were an incentive for unhealthy eating.

Table 3: Distribution of advertising and food and beverage availability in the video according to some features of the YouTube channels and videos watched (December 2020)

Property	Total		Food and Beverage Ads					Food and Beverage in Video				
			Yes		No		p-value	Yes		No		p-value
	n	%*	n	%*	n	%*		n	%*	n	%*	
Number of subscribers (n=325) * *												
First quartile	80	24.6	4	14.2	76	25.6		30	30.6	50	22.0	
Second quartile	80	24.6	7	25.0	73	24.5	0.160	33	33.7	47	20.7	**0.001**
Third quartile	80	24.6	5	17.9	75	25.3		23	23.5	57	25.1	
Fourth quartile	85	26.2	12	42.9	73	24.6		12	12.2	73	32.2	
Video views (n=345)												
First quartile	86	24.9	4	12.1	82	26.3		34	34.0	52	21.2	
Second quartile	87	25.2	5	15.2	82	26.3	**0.018**	30	30.0	57	23.3	**0.009**
Third quartile	86	24.9	9	27.3	77	24.7		19	19.0	67	27.3	
Fourth quartile	86	24.9	15	45.5	71	22.7		17	17.0	69	28.2	
Video duration (sec) (n=345)												
First quartile	83	24.1	14	42.4	69	22.1		24	24.0	63	25.7	
Second quartile	89	25.8	13	39.4	76	24.4	**0.001**	27	24.0	59	24.1	0.948
Third quartile	86	24.9	4	12.1	82	26.3		25	25.0	64	26.1	
Forth quartile	87	25.2	2	6.1	85	27.2		24	24.0	59	24.1	

*Column percentage.
* Number of subscribers in 20 channels were not specified.

DISCUSSION

As the findings of this study indicate, most of the food and beverage advertisements in the videos for children on YouTube are for foods of poor nutritional quality. Of all food and beverage ads, 66.6% were in a prohibited category (not suitable to be advertised to children) (24). Moreover, 28.1% contained also food and 6.1% beverages, regardless of the advertisements. The products containing sugar were the most common.

YouTube is one of the most frequently used social media platforms by children due to its wide visual content, simple interface, ease of access, and the convenience of watching any video as much as they want (16). In addition, advertisements on YouTube, tailored to one's personal interests by using cookies, are more persuasive for children (24). Since one must be at least 13 years old to sign up for YouTube, detailed demographic data for younger users is unlikely to be derived (25). However, children can access YouTube videos without creating an account, using an adult's account, or creating an account with a fake date of birth. This suggests that the actual demographic profile of YouTube users is different from what is known and that children are exposed to more advertisements than had been anticipated (26).

In a study conducted in Malaysia, advertisements on "food/beverage" took first place (38%); among these ads chocolate and sweets were the most common (16). In a recent study examining a total of 920 videos, food/beverage advertisements were the 5th largest category (6.7%) and unhealthy food advertisements were more common (74.2%) (27). In our study, we found that the percentage of food/beverage advertisements in all advertisements was consistent with the literature (9.1%), but the percentage of unhealthy foods that should not be advertised was quite high (66.6%). It indicates that children are exposed to unhealthy food advertisements in social media more than healthy ones.

In our study, there were some characters and fun activities in about half of the food advertisements and the vast majority of them had music. It was observed that unhealthy foods were presented in colorful packages and the characters who consumed those, used charming words (such as *delicious*). These make it easier for children to internalize the behaviors of these characters. Indeed, the literature emphasizes that less healthy nutrition cues are more often branded and described positively (28). In a study, parents stated that the elements that attract the attention of children in food advertisements were the music, the cartoon heroes, and the packaging of the products (29). Furthermore, our findings indicate that the advertising industry uses opportunities professionally to increase its influence besides a lot of tactics. For instance, it is quite striking that wafers are used while teaching colors in one of the videos watched. Though the wafers are not shown as branded, it is undeniable that it sets a negative example for children.

Although there are findings showing a relationship between video popularity and content (30); in our study, it is found that almost half of the food advertisements (60.8%) were in videos in the third and fourth quartile of subscribes of YouTube channels, most of the ads (81.8%) were shown in the third and fourth quartile of the numbers of video views and most of the ads (81.8%) were shown in the first half part of the videos. This result brings to mind the fact that the number of ads in videos depends on the preferences of the channel owners or whether they expect commercial gain (31). On the other hand, 97.2% of the advertisement was located as a full screen, which gave a very strong message to the audience. Out of 37 advertisements, 20 advertisements took at least 11 seconds on the screen, 12 advertisements stayed for more than 301 seconds which was 5 minutes. In this study, 37 advertisements related to nutrition in 345 videos, it can be evaluated as a low rate, nevertheless we consider that the methods used, the channels and videos chosen, and the time they are shown have an important effect on children, which increases the likelihood of children being affected. Also screen time and full screen advertisements can have a larger effect on the children who are focused on the video.

In a study that analyzed 380 YouTube videos uploaded by two influencers, more than 90% of the videos contained messages about food or drink (27). In our study, this percentage was lower; 12.5% of all the videos contained messages about healthy nutrition and 11.3% of them about unhealthy nutrition. However, in our study, the fact that most of the videos (45.5%) with the subject of "vlog" had food/beverage content can be interpreted in the same way. It is undeniable that the products advertised by popular people who are living their daily lives are more preferred by the audience (32). In addition, several studies draw attention to child influencers and reveal the importance of peer influence (33,34). In a recent study, 179 out of 418 videos of the top 5 most-watched child influencers (3–14-year-olds) on YouTube featured food and/or beverages, most of which (90.3%) were unhealthy and branded products (33). In our study, more than one-third of the videos featured peer children in advertisements on food and beverage.

In Turkey, similar studies were carried out mostly on television advertisements. In a large-scale study evaluating the advertisements on five TV channels, the most commonly advertised products were food and beverages (36.0%), and 78.8% of all food advertisements were foods that were not in line with WHO recommendations (35). Despite the current legal regulations for TV, this high number of inappropriate advertisements suggests that monitoring is insufficient, and thus concerns are raised about digital media.

Because of the consumer-oriented and easily accessible nature of YouTube, the probability of children's exposure to advertisements on this platform is very high. However, it is difficult to get clear information about the context of food marketing on this platform. Children's exposure to food marketing causes concern not only due to the number of ads but also the blurring of the boundaries between advertising and video content. It is more difficult for children to recognize because marketing is embedded in digital content (8,36).

When children are participating in digital media, they have the right to protection of their health and privacy and not to be economically exploited. Therefore, a rights-based approach is necessary to limit the widespread promotion of unhealthy foods in order to prevent all the negative consequences of children's exposure to these advertisements (7).

This study has several limitations. Firstly, the internet environment is so dynamic that the watch time, the number of clicks, the most watched channels, the number, and duration of advertisements on those channels are constantly changing. Secondly, we used the "incognito" browser mode to reduce potential biases related to "cookies". Actual exposure is thought to be more common because of cookie-facilitated targeted marketing that tracks children's online habits. Thirdly, the ads shown on YouTube may also differ by geographic location. Therefore, the ads in the study are country-specific and may not represent all regions. Another limitation is limited access to social media marketing-related data and ethical barriers to accessing personal accounts. In addition, we evaluated only You Tube content and did not consider the screen exposure of children watching this content, their viewing of advertisements, their access to advertising products and their growth status. The descriptive nature of the study and the limitations mentioned prevent causal inference.

CONCLUSION

As the findings of our study support, many unhealthy foods and beverages are advertised on the channels on You Tube which have millions of subscribers. It is also found that 37% of the videos gave unhealthy eating messages in the videos. The children are exposed to the risk of advertisements by the food and drink industry while watching videos on these channels. There is a need for regulations of advertising on the digital platforms. In order to make the current threats related to childhood obesity visible, industry monitoring is required. This makes it essential to periodically carry out such follow-up studies. New methodologies should be developed to measure the actual exposure of children to such advertisements.

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