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THE INFLUENCE OF FOOD MARKETING ON CHILDHOOD OBESITY: A REALITY?

A INFLUÊNCIA DO MARKETING ALIMENTAR NA OBESIDADE INFANTIL: UMA REALIDADE?

LA INFLUENCIA DEL MARKETING DE ALIMENTOS EN LA OBESIDAD INFANTIL Y: ¿UNA REALIDAD?

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ABSTRACT

Background: Currently, childhood obesity reaches proportions of increasing concern in all countries of the world. Exposure to advertising/marketing has been considered a factor that contributes to childhood obesity, with evidence that food advertising can be seen as a decisive factor for the development of childhood obesity.

Objective: Study the available evidences regarding the relationship between food advertising/marketing and childhood obesity.

Review Method: A scoping review was carried out by searching the Scielo®, and Pubmed® databases and database aggregators EBSCO®, and B-on®, between the years of 2014 and 2019. Inclusion and exclusion criteria were established and followed by the assessment of methodological quality based on the critical assessment tools of Joanna Briggs Institute (JBI).

Presentation and interpretation of the results: From the total of 709 articles obtained, 5 articles of a quantitative nature were selected. The analysed studies suggest that it is possible to have a relationship between food advertising and childhood obesity. All advertising regarding unhealthy foods can play an important role in increasing the risk of childhood obesity and acquiring poor dietary habits.

Conclusion: Children spend more and more time watching TV and have easier access to the internet, allowing themselves to be easily influenced by food advertisements. There is a possibility that food advertising has a negative influence on children's eating habits, and consequently contributes to childhood obesity. In this sense, it is essential that nurses empower both parents and children concerning the influence of advertising on eating habits and thus contribute to reducing childhood obesity rates.

Keywords: Childhood Obesity; Food Advertising; Food Marketing; Legislation.

RESUMO

Contexto: Atualmente a obesidade infantil atinge proporções cada vez mais preocupantes em todos os países do mundo. A exposição à publicidade/marketing tem vindo a ser considerada um fator que contribui para a obesidade infantil, existindo evidencia de que a publicidade a alimentos pode ser considerada um fator decisivo para o desenvolvimento de obesidade infantil.

Objetivo: Mapear a evidência disponível relativamente à relação que existe entre a publicidade/marketing alimentar e a obesidade infantil.

Método de Revisão: Elaborou-se uma *scoping review* através da pesquisa nas bases de dados Scielo®, Pubmed® e agregadores de bases de dados EBSCO®, B-on®, entre os anos de 2014 e 2019. Foram estabelecidos os critérios de inclusão e exclusão, e seguiu-se a avaliação da qualidade metodológica com base nas ferramentas de avaliação crítica no *Joanna Briggs Institute* (JBI).

Apresentação e Interpretação dos Resultados: No total obtiveram-se 709 artigos, dos quais foram selecionados 5 artigos de natureza quantitativa. Os estudos analisados, sugerem que é possível existir uma relação entre a publicidade a alimentos e a obesidade infantil. Toda a publicidade referente a alimentos não saudáveis, pode desempenhar um papel importante no aumento do risco de obesidade infantil e de adquirir maus hábitos alimentares.

Conclusão: As crianças despendem cada vez mais tempo a ver televisão e tem mais facilmente acesso à internet, deixando-se facilmente influenciar pelos anúncios a alimentos. Existe a possibilidade de que a publicidade a alimentos, tenha uma influência negativa nos hábitos alimentares das crianças, e consequentemente contribuir para a obesidade infantil. Neste sentido é fundamental, que os enfermeiros capacitem os pais e crianças, sobre a influência da publicidade nos hábitos alimentares e desta forma contribuir para a redução das taxas de obesidade infantil.

Palavras-chave: Legislação; Marketing Alimentar; Obesidade Infantil; Publicidade Alimentar.

RESUMEN

Contexto: Actualmente, la obesidad infantil alcanza proporciones de creciente preocupación en todos los países del mundo. La exposición a la publicidad/comercialización se ha considerado un factor que contribuye a la obesidad infantil, con evidencia de que la publicidad de alimentos se puede considerar como un factor decisivo para el desarrollo de la obesidad infantil.

Objetivo: Estudiar las evidencias disponibles sobre la relación entre la publicidad/marketing de alimentos y la obesidad infantil.

Método de Revisión: Se llevó a cabo una revisión de alcance mediante la búsqueda en las bases de datos Scielo® y Pubmed® y en los agregadores de bases de datos EBSCO® y B-on®, entre los años 2014 y 2019. Se establecieron criterios de inclusión y exclusión, y luego se realizó la evaluación de calidad metodológica basada en las herramientas de evaluación crítica del Instituto Joanna Briggs (JBI).

Presentación y interpretación de los resultados: Del total de 709 artículos obtenidos, se seleccionaron 5 artículos de naturaleza cuantitativa. Los estudios analizados sugieren que

es posible tener una relación entre la publicidad de alimentos y la obesidad infantil. Toda publicidad relacionada con alimentos poco saludables puede desempeñar un papel importante para aumentar el riesgo de obesidad infantil y adquirir malos hábitos alimenticios.

Conclusión: Los niños pasan cada vez más tiempo viendo televisión y tienen un acceso más fácil a Internet, lo que les permite ser fácilmente influenciados por los anuncios de alimentos. Existe la posibilidad de que la publicidad de alimentos tenga una influencia negativa en los hábitos alimenticios de los niños y, en consecuencia, contribuya a la obesidad infantil. En este sentido, es esencial que las enfermeras enseñen tanto a los padres como a los niños con respecto a la influencia de la publicidad en los hábitos alimenticios y, por lo tanto, contribuyan a reducir las tasas de obesidad infantil.

Descriptores: Comercialización de Alimentos; Legislación; Obesidad Infantil; Publicidad de Alimentos.

INTRODUCTION

Obesity is currently considered the epidemic of the 21st century and one of the most serious public health problems affecting children. Childhood obesity is reaching worrying proportions in all countries of the world and is considered an urgent and serious challenge, and therefore its prevention must be promoted⁽¹⁾. This pathology is a chronic disease, and at the same time, a risk factor that contributes to the development of other chronic diseases considered the main causes of mortality and morbidity⁽²⁾. Obesity and overweight are defined as the accumulation or excess of fat that hurts health, with obese children having a greater risk of becoming obese adults and developing chronic diseases⁽³⁾.

In 2019, in Portugal, around 29.6% of children were overweight and 12% were obese. Both overweight and obesity are more prevalent in boys 29.6% overweight and 13.4% obese, in the case of girls 29.5% are overweight and 10.6% obese⁽⁴⁾. There are numerous causes associated with childhood obesity, such as genetic factors, a sedentary lifestyle, excessive consumption of fats and sugars, as well as environmental factors due to changes in diet and lifestyle⁽¹⁾. However, exposure to advertising/marketing has also been considered a factor that contributes to childhood obesity, that is, there is evidence that food advertising can be considered a decisive factor in childhood obesity, as it can have a negative effect on children's dietary habits⁽⁵⁾.

Marketing associated with food products aimed at children is widely used by the industry, strategically directing ads to this age group, since children are the ones who influence the products purchased by parents. Television advertising has an important influence on children's food choices, as they spend much of their time watching television programs, thus becoming very vulnerable to the advertisements that are broadcast⁽⁵⁻⁶⁾.

Advertising aimed at food is generally not concerned with whether or not the advertised food is considered healthy for children, as it is rich in sugar, fat, and preservatives, so this type of advertising influences childhood obesity. Children, nowadays, dedicate much of their time to watching television, bearing in mind that advertisements are mostly about foods considered unhealthy, they can more easily acquire bad eating habits, in addition to also becoming more sedentary lifestyles, which is also one of the causes of childhood obesity⁽⁶⁾.

The relationship that has been observed between childhood obesity and the marketing/advertising of food products has led some countries to create laws to prohibit advertising aimed at the child population, to reduce childhood obesity rates⁽⁷⁾. Thus, it is only through adequate supervision of the advertisements that are broadcast, in this specific case those aimed at children, that the number of overweight or obese children can be reduced⁽⁶⁾.

Nowadays, advertising reaches the public in various ways, and it is sometimes difficult to control the various marketing techniques that emerge. Advertising is not restricted to television, which is just one of the forms of food marketing but is accessible through other means, such as the internet, and messages sent to mobile phones, billboards, in supermarkets, so it is essential to take measures to control food marketing⁽⁵⁾. Food marketing and advertising restriction can fit into the various measures that ensure children's rights, which are present in the Convention on the Rights of the Child, based on some of the articles that are contemplated⁽⁸⁾.

Children are the target of marketing and advertising aimed at food, and this has a great impact on their eating choices and habits⁽⁹⁾. The following strategies can be considered effective in restricting advertising of foods that are less healthy for children, such as the existence of regulations for food marketing, increasing marketing of healthy foods, and even increasing knowledge in the school environment about the importance of the acquisition of healthy habits and the impact of marketing⁽⁵⁾. There are numerous documents from the World Health Organization [WHO] that recommend Member States implement some measures to reduce the impact of marketing and advertising of unhealthy foods, such as the *WHO European Food and Nutrition Action Plan 2015-2020* and the *Report of the WHO Commission on Ending Childhood Obesity*. By international recommendations,

Portugal has given importance to the implementation of measures to control food advertising aimed at children. Since 2016, Portugal coordinates the *WHO European Action Network on Reducing Marketing Pressure on Children*, which is a European network to contribute to the reduction of food marketing and advertising aimed at children⁽⁸⁾.

In legal terms, in Portugal, in 2019, Law No. 30/2019 of April 23 was published, which places restrictions on advertising aimed at children under 16 years of age, about food and drinks that contain a high energy value, the content of salt, sugar, saturated fatty acids and transformed fatty acids. According to this law, advertising of the aforementioned foods is prohibited in preschool, basic and secondary schools; in public playgrounds; in a surrounding radius of 100 meters organized in the aforementioned places, and also in sports, cultural and recreational activities organized in educational establishments. It is also prohibited to advertise this type of product in television programs and audiovisual communication services and on the radio in the 30 minutes before and after children's programs, and television programs that contain at least 25% of the audience under 16 years of age. As well as in advertising that appears in movie theaters and films rated for children under 16 and on the internet, on websites and mobile applications with content aimed at children under 16⁽¹⁰⁾.

The objective of this review is to map the available evidence regarding the relationship between food advertising/marketing and childhood obesity. It is the responsibility of the Nurse Specialist in Child Health and Pediatrics Nursing [EEESIP] to promote the highest possible state of health, as such, it is essential to prevent and detect as early as possible situations that affect the child's quality of life⁽¹¹⁾. It is up to the nurse to reinforce, both within the family and at school, the importance of acquiring healthy eating habits, as well as warning about the various forms of advertising of mainly unhealthy foods, to which children are subject so that they are awake to this reality⁽¹²⁾. And in this way, it is possible to prevent childhood obesity, for example by using health education sessions and other forms of awareness among the population.

METHODS

Currently, nurses are often encouraged to seek scientific knowledge to improve care delivery and facilitate their decision-making. To develop knowledge, a literature review was carried out, in this case, a scoping review. This review allows the investigator to identify the gaps in the investigation, allowing all the results found on the subject to be included⁽¹³⁾.

To structure the nurses' skills in the prevention of childhood obesity associated with food marketing and advertising, a research question was formulated "What is the relationship between childhood obesity and food marketing?", using the method from the mnemonic population, concept, and context (PCC):

- Population: Children;
- Concept: Impact that food marketing has on childhood obesity;
- Context: Clinical environment, family environment, and school.

Based on the elaboration of the question that was formulated, the general objective was defined: to map the available evidence regarding the relationship between food advertising/marketing and childhood obesity. Regarding the specific objectives, it is intended to understand whether there is legislation associated with advertising or food marketing aimed at children, and what is the influence of lifestyle habits influenced by advertising on childhood obesity.

There was an online search in the following scientific databases: CINAHL Complete, MEDLINE Complete, Nursing & Allied Health Collection: Comprehensive, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, Cochrane Methodology Register, Library, Information Science & Technology Abstracts and Mediclatina (via the engine EBSCO® search engine); Academic Search Complete, American Chemical Society, American Institute of Physics, Annual Reviews, Association for Computing Machinery, Association for Computing Machinery, Business Source Complete, Coimbra University Press, Current Contents (ISI), Elsevier, Essential Science Indicators (ISI), Nature, Royal Society of Chemistry, Sage, Society for Industrial and Applied Mathematics, Springer, Taylor & Francis (through the B-on® search engine); Scielo® and PubMed®. The descriptors used were associated using the Boolean AND, resulting in "obesity" AND "children" AND "food marketing". The established search constraints were articles with full text (Fulltext), in Portuguese and English, between January 2014 and October 2019, and articles in indexed and peer-reviewed journals.

The defined inclusion criteria are articles related to marketing and food advertising associated with childhood obesity. It should be noted that all articles that did not meet the inclusion criteria were not selected. About the exclusion criteria, the following were considered: articles that did not address food advertising and marketing; articles that did not refer to pediatric age, as well as childhood obesity, and articles that were found repeated in the various databases. An evaluation of the methodological quality of the articles selected by three reviewers independently was carried out, using the critical evaluation tools of *Joanna Briggs Institute* (JBI)⁽¹⁴⁾. The studies included in this integrative review obtained a score greater than 50% in the respective JBI evaluation grids, which means that they are feasible, adequate, and scientifically significant.

RESULTS

Data collection was carried out in November 2019 using the previously mentioned Boolean and descriptors. The articles found in the databases were the following: in EBSCO®, 24 articles were obtained, of which only 1 was selected; in Scielo® 1 article was obtained, which was not selected. In B-on® 442 articles were found in total, but only 4 were selected, while in PubMed® 242 articles were obtained and 7 were considered relevant to the theme addressed. All articles selected as previously described were through the title. That is, a total of 709 articles were obtained, of which 697 were excluded by title, that is, 12 articles were selected, and by reading the abstracts, 5 of these articles were excluded. Finally, 7 articles were analyzed in full, of which 5 articles were selected for the elaboration of this review, according to the previously defined inclusion and exclusion criteria. The selection process followed the principles of the PRISMA – Flow model Diagram for the Scoping Review Process, which is represented in Figure 1⁷.

The data extracted from the selected studies are shown in the following table (Table 1⁷) divided into study title, author/year, country, sample, research methods, study objectives, and results.

Whenever it was necessary to use a bibliography, copyright was respected, with the use of citations and respective references.

The levels of evidence of the articles analyzed according to *Joanna Briggs Institute* (JBI) were level 1 (A3, A4) and level 4 (A1, A2, A5). The studies were developed in several countries, distributed as follows: South Korea (1 study), Portugal (1 study), Australia (1 study), Canada (1 study), and Mexico (1 study). These studies were grouped according to the methodological approach that was used, so they are all quantitative.

The samples of the analyzed articles correspond to the pediatric population, namely children between 7 and 14 years old (4 studies) and a sample in primary schools (1 study).

All articles relate food marketing to childhood obesity, however, there are several forms of marketing/advertising, so three of the studies address the impact of television advertising on children's food choices. Another study addresses the impact of advertising available on the Internet and finally one of the studies describes the impact of advertising that exists in schools.

DISCUSSION

A great concern with the influence that advertising can have on children has been found in the literature⁽⁹⁾. Considering the high rates of childhood obesity worldwide, it is essential to create strategies to control food marketing. Nowadays, advertising is found in the most varied places and new marketing techniques have been emerging, which are very difficult to monitor⁽⁵⁾. In line with WHO recommendations, measures have been implemented in Portugal to control food advertising aimed at children, namely with the approval of Law No. 30/2019, which restricts advertising aimed at minors⁽⁸⁾.

The studies analyzed for the preparation of this literature review address the relationship between childhood obesity and the various forms of food advertising/marketing to which children are subject today.

Concerning children's exposure to food advertising, both foods with high levels of energy and without nutrients and healthier foods are associated with children's eating behaviors. Increasing exposure to advertising for healthy foods, rather than advertising for high-energy, nutrient-depleted foods, can help promote healthier eating habits among children. However, due to the lack of advertising for foods that are considered healthy, it was not possible to observe whether there is an association between fruit and vegetable intake and advertising. It was, therefore, possible to conclude that lower exposure to television advertising for foods with high levels of energy and without nutrients, may be associated with an increase in the intake of fruit and vegetable advertising⁽¹⁵⁾. Other studies are in agreement with the results obtained previously, since the foods that are most frequently advertised are mostly of high energy density and poor in micronutrients⁽⁵⁾, and there is no way to be sure about the influence of advertising on healthy foods.

In a study carried out with Portuguese children, it was considered that advertising on television influences the willingness that children demonstrate to try fast-food products that are advertised on television and, in this way, ask their parents to buy them. What children value most in fast-food restaurants is the taste of the food and the gifts they are offered, these being the most important elements of the advertising they see on television. As mentioned in other analyzed studies, most children ask their parents to buy the products for the toy, and some of the foods that come with gifts or games, mostly have low or no nutritional value^(12,16). Since there is a relationship between the time children spend watching television and the frequency with which children consume fast-food, both on school days and weekends, and holidays, it seems to indicate that the more time they spend watching television, the greater the number of times they consume this type of food⁽¹⁷⁾. The data presented about the time spent watching television are disturbing, according to other authors, most children watch twice as much or more than the recommended hours⁽¹²⁾.

The viewing time of television programs that contain food advertisements influences the consumption of high-energy foods during meals, as well as before meals, however, according to a study carried out in Canada, this influence varies according to age and Body Mass Index [BMI]. These results partially support the hypothesis that overweight or obese children consume more energy while watching television programs with advertisements related to food, compared to non-food advertisements⁽¹⁸⁾. Another study corroborates what was previously mentioned, as the data seem to indicate that higher BMI values are related to longer television viewing and a higher frequency of fast-food consumption⁽¹⁷⁾.

In a study carried out in South Korea, it was not possible to conclude that exposure to advertising specifically to foods with high levels of energy and without nutrients on television is associated with overweight or obesity since it was not possible to analyze the exclusive effect of exposure to food advertising that is shown on television. However, it is concluded that there is a possibility of an association between exposure to advertising related to all types of food on television and overweight or obesity, food preferences, and the consumption of foods with high levels of energy and without nutrients⁽¹⁵⁾. According to other studies, there is already some evidence that advertising for food and beverages can be, among others, a determining factor in childhood obesity, due to the negative influence, it exerts on children's eating habits⁽⁵⁾. Television advertising related to food can, therefore, play an important role in increasing the risk of childhood obesity and unhealthy eating behaviors⁽¹⁵⁾.

The interest in television programs without any kind of advertising can be considered a factor that contributes to food intake and is also a possible explanation for the increase in food intake only in overweight or obese females⁽¹⁸⁾. It was also possible to verify that the fact of watching television can be more predictive of obesity than advertising itself, because sedentary behavior and eating small snacks while watching television, as well as exposure to advertising, increase as we get older. viewing on television. Therefore, it is difficult to determine only the real effect of advertising⁽¹⁵⁾. It should be noted that it goes against what another study refers to, as children who spend more time watching television or using the computer are those who are overweight, and that in addition to a sedentary lifestyle which is a cause for the development of obesity also leads to greater consumption of unhealthy foods⁽¹⁶⁾.

As previously mentioned, advertising reaches children through the most varied means, with Internet advertising representing a very popular medium that attracts a growing proportion of advertising companies' budgets. One of the analyzed studies shows that children between 7 and 13 years old can be influenced by advertising. To eliminate the influence of food advertising, children must be able to compare the consequences of long-term consumption for their health⁽¹⁹⁾. Childhood obesity and the digital marketing of products that are considered unhealthy is a new global challenge for public health that urgently needs to be discussed⁽²⁰⁾. Food marketing aimed at children has been changing rapidly. It is expected that digital advertising will become a significant medium, as it manages to direct advertisements to a certain group of more susceptible children⁽¹⁹⁾.

The environment is considered a factor that influences childhood obesity and has been described in the literature as a concern in recent years⁽²¹⁾. A study carried out in Mexico shows the influence of the environment, demonstrating that most primary schools were surrounded by convenience stores, which function as marketing units for food and beverages. It is also concluded that children who attend public schools are more likely to be exposed to this type of marketing when compared to children from private schools, who are typically wealthier and located in more affluent and more protected neighborhoods. It is essential to monitor the environment and identify ways to protect children from food marketing, not only within elementary schools but also in their surroundings⁽²²⁾. The education of children as well as parents or educators alone is not enough to change their food preferences, as they are constantly exposed to advertisements for less healthy foods. It is essential to increase children's knowledge of persuasive advertising and food education, which should be seen as one of the tools to develop healthier food choices among children and consequently reduce obesity⁽¹⁹⁾.

CONCLUSIONS

Childhood Obesity has become a growing concern worldwide, with numerous causes contributing to its development, including the influence of food marketing/advertising. Nowadays, advertising is on the rise in the most diverse media, not just through television or billboard ads, but other media that are increasingly popular such as the internet. Some of the studies analyzed indicate that children spend more and more time watching television and have easier access to the internet, allowing themselves to be easily influenced by food advertisements, there must be greater regulation in food advertising. In Portugal, in 2019, a law was published that aims to restrict food advertising to children, so there must be greater rigor in terms of regulating food advertising.

In the elaboration of this literature review, there were some limitations, such as the scarcity of literature that addressed the chosen theme, as well as the fact that the results that were obtained in the analyzed studies have a small sample, which is not representative of the populations studied, being able to generalize the results. However, all the studies analyzed indicate that there is a possibility that the various forms of food advertising have a negative influence on children's eating habits, and consequently contribute to childhood obesity.

With the elaboration of this review, the need to develop more studies on this subject is confirmed, particularly in Portugal, but also worldwide. At a national level, he considers it essential not only to understand the changes that arise with the recent law, which regulates advertising aimed at children. But also, to obtain more representative results for the Portuguese population, on the relationship between food advertising and childhood obesity. This review is an asset, as it allows nurses to reflect on the various forms of advertising that children are currently subject to, to train parents and children about the influence of advertising on eating habits, and thus reduce high rates of childhood obesity.

Authors' contributions

AD: Study coordination, study design, collection, storage and analysis review and discussion of the results.

MM: Study design, data analysis, review and discussion of results.

AR: Study design, data analysis, review and discussion of results All authors read and agreed with the published version of the manuscript.

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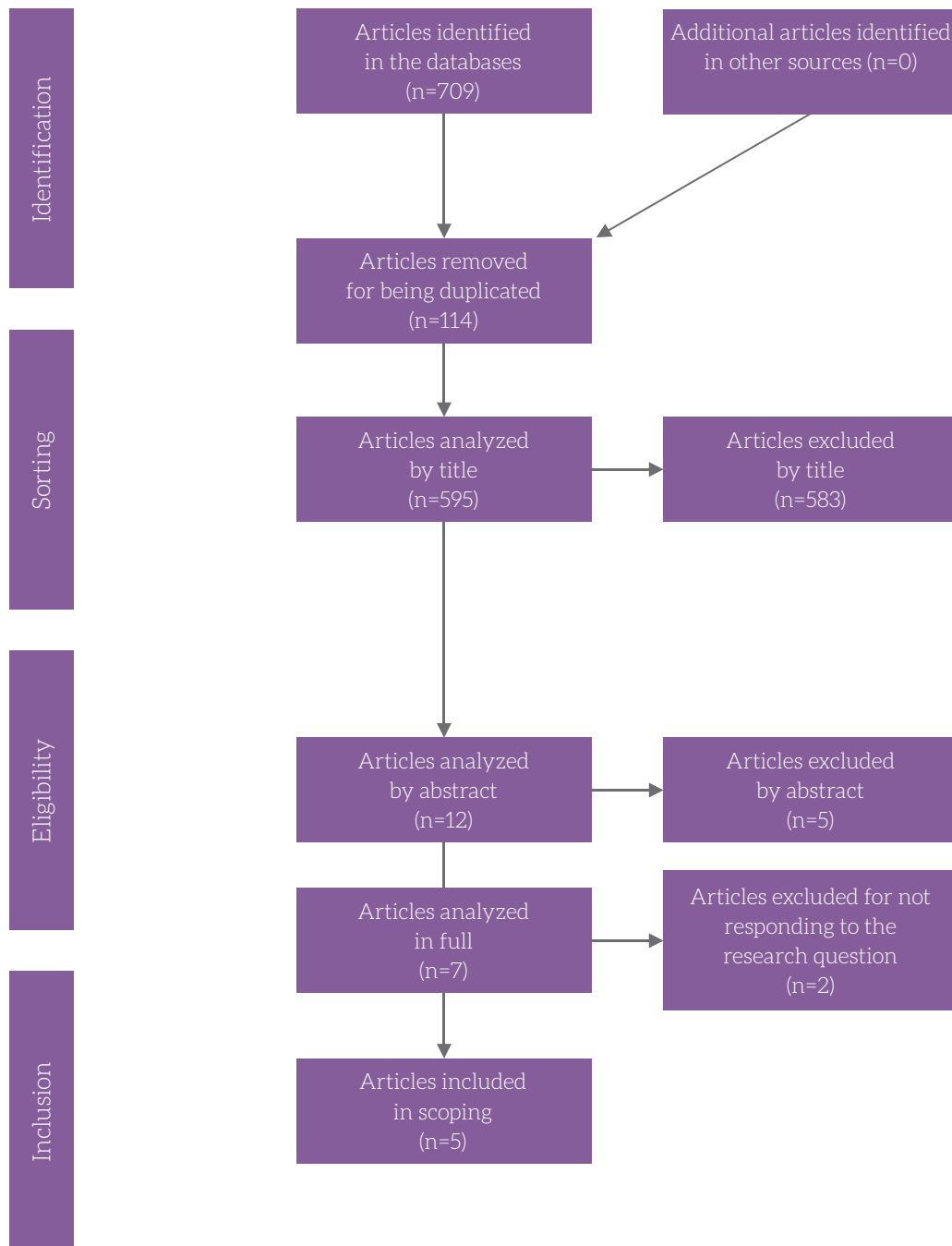


Figure 1 – Flowchart of the article selection process.^κ

Table 1 – Data extracted from the included studies.↗

Article Title	Author/ Year/ Country	Sample	Research Methods	Purpose of the study	Results
“Effects of exposure to television advertising for energy-dense/ nutrient-poor food on children’s food intake and obesity in South Korea”	Lee, Kim, Lee, Yoon & Chung (2014) South Korea.	2419 children between 11 and 13 years old from 118 schools in 16 cities and provinces in South Korea.	A cross-sectional descriptive quantitative study.	To determine the effect of television food advertising on participants’ food choices and their risk of obesity.	Although it was not possible to conclude that exposure to television advertising related to energy-rich/nutrient-poor (RE/PN) foods is associated with an increased risk of obesity, a preference for these foods, or generalized food intake, there is reason to believe in the effects of advertising on increasing the risk of obesity. Exposure to all food advertising about RE/PN foods was associated with a low intake of healthy foods such as fruits and vegetables. The study also suggests that it may be necessary to increase public health campaigns and reduce advertisements for RE/PN foods to help decrease the incidence and prevalence of obesity.
“Fast-Food Marketing strategies and their impact on childhood obesity”	Herédia, Hipólito, Nunes, Ribeiro, Moura & Laneiro (2017) Portugal.	60 children aged between 8 and 12 who attend two clinics in the Lisbon region.	A cross-sectional descriptive quantitative study.	To verify whether food choices in children between 8 and 12 years old are influenced by television advertising and to what extent this may have repercussions on BMI.	It was found that regarding the time they spend watching television on weekdays and weekends or holidays, most respondents said they watched it for 1 to 2 hours a day during school days and 2 to 3 hours a day at school. weekends and holidays. As for the frequency of fast-food consumption, the majority 68.4% said they had not eaten or had eaten 1 to 2 times in the last month, however, 31.60% of respondents had a frequency of fast-food consumption of 3 or more times in the last month. Television advertising makes children want to try advertising fast food and ask their parents to buy it. The taste and gifts offered are what children appreciate most in fast-food restaurants. Children who ask their parents to buy a particular food have higher BMI values.

Table 1 – Data extracted from the included studies.↔↔

Article Title	Author/ Year/ Country	Sample	Research Methods	Purpose of the study	Results
“Food advertising, children’s food choices and obesity – interplay of cognitive defences and product evaluation: an experimental study”	Tarabashkina, Quester & Crouch (2016) Australia.	Australian children between 7 and 13 years old.	A randomized experimental quantitative study controlled.	Investigate the role of product reviews, nutritional knowledge, and persuasion in children's food choices, realizing how easy it is for children to browse the internet.	The choice of snacks for children can vary as a result of persuasion, nutritional knowledge, and product evaluation. Nutritional knowledge alone is not enough to ensure that children make healthier food choices. The factors that compromise children's cognitive defenses are related to taste, the social appeal of foods, and low nutritional knowledge and persuasion. Obese children were more likely to belong to a group of less informed children.
“Mealtime exposure to food advertisements while watching television increases food intake in overweight and obese girls but has a paradoxical effect in boys”	Anderson, Khodabandeh, Patel, Luhovyy, Bellissimo & Mollard (2015) Canada.	Children between 9 and 14 years of age are born at term and with normal weight at birth.	The controlled randomized experimental quantitative study.	To investigate the effects of exposure to food advertisements during a meal, compared to non-food advertisements, such as appetite 30 minutes after consuming glucose or sugary drinks in normal weight, overweight/obese children.	This study shows that viewing television programs with advertisements for food during and before meals, differing by gender and body mass index, interferes with children's appetite. Food advertisements on television programs watched during meals increased calorie intake only in overweight or obese female children. Therefore, the results partially support the hypothesis that overweight or obese children consume more energy while watching a television program, with food advertisements, compared to non-food advertisements.

Table 1 – Data extracted from the included studies.↵

Article Title	Author/ Year/ Country	Sample	Research Methods	Purpose of the study	Results
“The obesogenic environment around elementary schools: food and beverage marketing to children in two Mexican cities”	Barquera, Hernández-Barrera, Rothenberg & Cifuentes (2018) Mexico.	A random sample of primary schools in two Mexican cities.	A cross-sectional descriptive quantitative study.	To analyze and describe the presence of food and beverage advertising around two schools in Mexico City and to assess compliance with both Pan's recommendations and the American Health Organization such as the Mexican food industry's self-regulation regarding the marketing of food and beverages aimed at children.	It is important to monitor and identify ways to protect children from food marketing, not only in primary schools but also among them. This monitoring should be reinforced for public schools and for neighborhoods where the average income of families is low. As in other public health policies, the planning of these measures must take into account potential unwanted effects and create mechanisms to prevent them. In this particular case, coordinated local action is needed, aligned with government policies, to avoid marketing strategies aimed at the consumption of unhealthy foods by children in schools.