

Indicators of the obesogenic environment and the influence of parenting styles on eating behavior in schoolchildren*

Indicadores do ambiente obesogênico e a influência dos estilos parentais no comportamento alimentar em escolares

Indicadores del ambiente obesogénico y la influencia de los estilos parentales en el comportamiento alimentario de estudiantes

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This study aims to analyze the influence of the obesogenic environment and parental styles on the eating behavior of children and adolescents. This is a study with a quantitative approach, carried out in the first semester of 2017, with a sample recruited from two private schools with 272 middle class children and adolescents, from Campina Grande, in the state of Paraíba, Brazil. In 40% of cases, mothers and fathers were classified as negligent according to their children's assessment, as well as 50% of fathers were considered permissive, and always or almost always had ultra-processed foods at home. The highest average found in the subscale "*Over emotional ingestion*" were of children of permissive mothers (7.3) in relation to neglectful mothers (5.2; $p = 0.01$). The data suggest that parents may have a silent attitude in the process of modeling healthy eating behavior towards their children, and that even though parenting styles are important for the formation of their children's eating behavior, they are still not enough, because genetic, epigenetic and environmental factors are also important to understand it.

Descriptors: Feeding behavior; Obesity; Child; Adolescent.

O objetivo do estudo foi analisar a influência do ambiente obesogênico e dos estilos parentais no comportamento alimentar de crianças e adolescentes. Trata-se de estudo de abordagem quantitativa, realizado no primeiro semestre de 2017, cuja amostra foi recrutada em duas escolas privadas com 272 crianças e adolescentes de classe média, de Campina Grande, Paraíba. Em 40% dos casos, as mães e pais foram classificados como negligentes segundo a avaliação dos filhos, bem como 50% dos pais foram considerados permissivos, e possuíam sempre ou quase sempre alimentos ultraprocessados em casa. A média mais elevada encontrada na subescala "*Sobre ingestão emocional*" foram de filhos de mães permissivas (7,3) em relação às negligentes (5,2; $p=0,01$). Os dados sugerem que os pais podem ter uma atitude omissa no processo de modelagem do comportamento alimentar saudável em relação aos filhos, e que mesmo os estilos parentais sendo importantes para formação do comportamento alimentar dos filhos, ainda não são suficientes, pois as influências genéticas, epigenéticas e ambientais também são importantes para compreendê-lo.

Descritores: Comportamento alimentar; Obesidade; Criança, Adolescente.

El objetivo del estudio fue analizar la influencia del ambiente obesogénico y de los estilos parentales en el comportamiento alimentario de los niños y adolescentes. Se trata de un estudio de enfoque cuantitativo, realizado en el primer semestre de 2017, cuya muestra fue reclutada en dos escuelas privadas con 272 niños y adolescentes de clase media, en Campina Grande, Paraíba, Brasil. El 40% de los casos, las madres y los padres fueron clasificados como negligentes según la evaluación de sus hijos, así como el 50% de los padres fueron considerados permisivos y siempre o casi siempre tenían alimentos ultraprocessados en casa. El promedio más alto encontrado en la subescala "*Sobre ingesta emocional*" fueron los hijos de madres permisivas (7,3) en relación con las negligentes (5,2; $p=0,01$). Los datos sugieren que los padres pueden tener una actitud negligente en el proceso de modelar un comportamiento alimentario saludable hacia sus hijos y que incluso los estilos parentales que son importantes para modelar el comportamiento alimentario de sus hijos todavía no son suficientes porque las influencias genéticas, epigenéticas y ambientales también son importantes para entenderlo.

Descriptores: Conducta alimentaria; Obesidad; Niño; Adolescente.

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INTRODUCTION

Eating behavior is established at an early age, and eating habits during adulthood reflect not only the habit acquired during childhood, but the environment where this learning took place¹. Currently, the environment is considered obesogenic in many countries, as it favors unhealthy practices, and in this context, eating is identified as one of the main practices to suffer environmental influence^{1,2}.

Knowledge of the relationship between environment and health is important, because it allows identification of environmental characteristics that may interfere immediately or not in the health of the population². The environment can limit or promote the opportunity for each individual to develop a healthy life^{1,2}. The family, especially the parents, and the media directly influence the establishment of healthy habits in childhood, that is, the practice or not of physical activity and whether or not to have a healthy diet²⁻⁴. As a consequence of unhealthy eating practices, there is an increase in the incidence and mortality rates due to chronic diseases in childhood and adulthood¹⁻³.

Although eating habits are determined by different factors (environmental, personal and rearing), most studies in the area of food and nutrition do not analyze the impact of psychosocial characteristics associated with parents on their children's eating behavior. Given this, the objective of this study was to analyze the influence of the obesogenic environment and parental styles on the eating behavior of children and adolescents.

METHOD

This is an observational, cross-sectional study with a quantitative approach, carried out in two private schools that serve middle class children and adolescents, located in Campina Grande, in the state of Paraíba, Brazil.

The sample consisted of children enrolled in classes from the 5th to the 9th grades, aged between nine and fourteen years old, who were willing to participate in the research with their respective parents and/or caregivers. Data collection took place between February and June of 2017. The questionnaire used to classify parenting styles was answered by children and adolescents in a school environment. Questionnaires related to eating behavior, socioeconomic variables and media influence were sent to parents and/or caregivers to be answered at home.

Exclusion criteria were children who presented illnesses and/or cognitive disorders that interfered in the response capacity, as well as metabolic disease or eating disorder (bulimia and/or anorexia) that influenced daily eating behavior.

The sample was characterized according to gender, age, maternal education, occupation of parents, indicators of obesogenic environment and access to media. Parental styles (PS)⁴ were considered as exposure variable and as outcome variables: eating behavior assessed through psychological dimensions related to eating behavior⁵ and household food availability defined as the presence of food at home in the last 30 days⁶, categorized according to the food guide for the Brazilian population⁷.

Information on the obesogenic environment was obtained from a form on children's lifestyles and environment⁸. The obesogenic environment was measured by the presence in the surroundings of the residence (leisure space, safety of locality, traffic and conservation of sidewalks), safety for walking and/or cycling, unpleasant traffic, exposure to media, and access to minimally processed and/or ultra-processed foods, as well as the presence of adequate public space for daily activities or physical activities.

No standardized and validated instrument was found to assess household food availability. We chose to use part of the questionnaire from the Eating Among Teens Project (EAT-III) at the University of Minnesota, United States, which was translated to Portuguese and adapted⁹. The classification of parental style was performed using the Scales of Requirement and Responsiveness¹⁰. They have been translated to Portuguese, adapted and validated for

children⁴. Feeding behavior was assessed using the Child Eating Behavior Questionnaire (CEBQ)¹¹.

The frequency data were described in absolute (n) and percentage (%) and analyzed using the SPSS version 22.0 program. The association between food availability reported according to frequency (never/almost never/sometimes, almost always/always) and parenting styles was verified using the chi-square test.

The comparison of the means of the subscales to assess children's eating behavior in relation to parenting styles was done using the ANOVA test and the Bonferroni post-hoc test was used to identify where the difference was in the groups. Variables with $p < 0.05$ were considered significant.

This study was submitted to the Research Ethics Committee Involving Humans of the Health Sciences Center of the Universidade Federal de Pernambuco (CAAE: 60476116.0.0000.5208).

RESULTS

272 children and adolescents participated. They were between nine and fourteen years old, 44.6% male and 55.4% female, enrolled in two private schools in Campina Grande, in the state of Paraíba.

The mothers were the main caregivers (87.1%) and the questionnaires were answered mostly by them (83.1%). Approximately 60% of the schoolchildren's parents worked from home.

Regarding the obesogenic environment, 27% of the informants report that, around their residence, there is no space for recreation and leisure, and that near the residence it is not safe to walk or ride a bicycle (46.3%). Also, they report that traffic on the streets makes walking or jogging unpleasant or dangerous (51.8%), that people do not practice physical exercise close to their homes (23.2%) and more than 30% stated that, in the surroundings of the residence, the sidewalks were not in good condition. Most parents consume greens and vegetables (96.3%); and 65% of parents consumed soda, snacks, chips and frozen foods.

Regarding exposure to media, about 30% watch television at mealtimes, mostly at lunch (22.5%) and television was the most cited electronic media exposure device (93.3%), followed by mobile phone (86.8%).

Regarding parental style, 40.8% of mothers were classified as negligent according to their children's assessment, and 41.2% of parents were assessed similarly. Mothers were referred to as authoritarian by 26.8% of children, and approximately 15% of fathers were classified as permissive (Table 1).

Table 1. Maternal and paternal parenting styles. Campina Grande, Brazil, 2017.

Maternal parenting styles		Paternal parenting styles	
Variables	n (%)	Variables	n (%)
Authoritative	51 (18.8)	Authoritative	74 (27.3)
Permissive	36 (13.3)	Permissive	40 (14.8)
Authoritarian	73 (26.9)	Authoritarian	46 (16.6)
Negligent	111 (41.0)	Negligent	112 (41.3)

When analyzing availability of food at home in relation to parenting styles, among permissive parents, 50% always had or almost always had ultra-processed foods at home in relation to negligent parents (29.5%), showing a significant difference ($p = 0,04$) (Table 2).

Table 2. Paternal parenting styles and availability of food at home. Campina Grande, Brazil, 2017.

Variable	TOTAL N (%)	Food availability <i>In natura/minimally processed</i>			Food availability Ultra-processed		
		Never/ Almost never/ Sometimes	Always/ Almost always	<i>p</i>	Never/ Almost never/ Sometimes	Always/ Almost always	<i>p</i>
Paternal parenting styles	N = 272 (100)						
	n (%)	n (%)	n (%)		n (%)	n (%)	
Authoritative	74 (27.3)	14 (18.9)	60 (81.1)	0.41	40 (54.1)	34 (45.9)	0.04
Permissive	40 (14.8)	11 (27.5)	29 (72.5)		20 (50.0)	20 (50.0)	
Authoritarian	46 (16.6)	14 (31.1)	31 (68.9)		27 (58.7)	19 (41.3)	
Negligent	112 (41.3)	31 (27.7)	81 (72.3)		79 (70.5)	33 (29.5)	

p = association value of chi-square.

Regarding maternal parental style, the availability of fresh or minimally processed food was 67.6% among those considered negligent 88.2% and among those considered authoritative (45/51; *p* = 0.01) (Table 3).

Table 3. Maternal parenting styles and availability of food at home. Campina Grande, Brazil, 2017.

Variable	TOTAL N (%)	Food availability <i>In natura/minimally processed</i>			Food availability Ultra-processed		
		Never/ Almost never/ Sometimes	Always/ Almost always	<i>p</i>	Never/ Almost never/ Sometimes	Always/ Almost always	<i>p</i>
Maternal parenting styles	N = 272 (100)						
	n (%)	n (%)	n (%)		n (%)	n (%)	
Authoritative	52 (18.8)	06 (11.8)	45 (88.2)	0.01	35 (67.3)	17 (32.7)	0.53
Permissive	36 (13.3)	06 (16.7)	30 (83.3)		24 (66.7)	12 (33.3)	
Authoritarian	73 (26.9)	22 (30.1)	51 (69.9)		44 (60.3)	29 (39.7)	
Negligent	111 (41.0)	36 (32.4)	75 (67.6)		63 (56.8)	48 (43.2)	

p = association value of chi-square.

The difference in means found in the subscale "On emotional ingestion" was significant among children of permissive mothers (7.3) in relation to negligent mothers (5.2; *p* = 0.01) (Table 4). Regarding paternal parenting styles, it was found that the highest averages of the subscales were of permissive parents, with the exception of "response to food" and "slow eating". When dealing with maternal parenting styles, similar results were obtained, where the highest scores of the subscales of eating behavior were of permissive mothers, except for "response to food", "desire to drink" and "response to satiety".

Table 4. Mean ± standard deviation of the CEBQa subscales according to the categories of paternal and maternal parenting styles. Campina Grande, Brazil, 2017.

Parenting styles	Response to food Mean (SD)	Pleasure in eating Mean (SD)	Over emotional ingestion Mean (SD)	Desire to drink Mean (SD)	Response to satiety Mean (SD)	Slow ingestion Mean (SD)	Food selectivity Mean (SD)	Sub emotional ingestion Mean (SD)
FATHER								
Authoritative	11.9 (3.1)	8.9 (4.4)	5.4 (3.9)	5.8 (3.8)	9.6 (3.6)	7.2 (2.7)	11.4 (3.6)	6.9 (4.0)
Permissive	11.1 (3.4)	9.4 (5.0)	6.1 (3.6)	7.0 (3.5)	10.3 (3.1)	7.2 (2.7)	11.6 (3.7)	7.6 (3.9)
Authoritarian	11.5 (3.7)	8.2 (4.4)	5.8 (4.2)	5.4 (3.5)	9.6 (3.2)	6.4 (2.3)	10.5 (3.9)	6.8 (4.0)
Negligent	11.3 (3.3)	9.0 (4.4)	5.9 (4.2)	5.7 (3.6)	9.8 (3.4)	7.5 (2.5)	11.4 (3.4)	7.3 (3.4)
<i>p</i> *	0.61*	0.68*	0.81*	0.20*	0.79*	0.08*	0.06*	0.71*
MOTHER								
Authoritative	12.1 (3.3)	9.5 (4.5)	6.6 (3.9)	5.3 (3.6)	9.3 (3.2)	6.9 (2.4)	11.6 (2.8)	7.5 (3.3)
Permissive	11.7 (3.0)	9.6 (4.9)	7.3 (4.9)	5.4 (3.9)	9.4 (2.7)	7.8 (2.7)	12.3 (3.6)	7.6 (4.0)
Authoritarian	11.2 (3.2)	7.9 (5.6)	5.3 (3.7)	5.9 (3.9)	9.5 (3.7)	7.1 (2.6)	10.9 (3.9)	6.9 (3.8)
Negligent	11.3 (3.5)	9.0 (4.7)	5.2 (3.7)	6.3 (3.5)	10.3 (3.5)	7.3 (2.6)	11.1 (3.7)	7.0 (3.8)
<i>p</i> *	0.44*	0.15*	0.01*	0.40*	0.23*	0.40*	0.24*	0.74*

^a CEBQ, Children's Eating Behavior (questionnaire to assess children's eating behavior).

^b Classification of parenting styles according to the instrument of Weber (2004) that validated the instrument that measures demand and responsiveness. *p* * (Anova Test). * (Bonferroni test).

DISCUSSION

The results suggest that the children and adolescents surveyed live in an environment with obesogenic characteristics, and that parenting styles can favor installation of unhealthy eating behaviors. The explanatory models of determinants of infantile eating behavior point to multi-causality, that is, eating behavior results from the interaction of physiological, psychological, social and environmental factors¹².

Of the theoretical models proposed to explain this phenomenon, the most current ones are aligned with the ecological perspective¹³. These models present some variables evaluated in this study and seek to characterize the microsystems where the child or adolescent lives: the proximal context, where the direct influence of the parents is observed - in other words, the family environment¹⁴.

As the main results related to the influence of the environment, it was found that the environment in which these children live is conducive to the installation of bad practices and bad eating habits: unhealthy eating by parents; difficulty in practicing physical activity in an appropriate place within a social context considered safe; lack of space for walking and leisure, and exposure to media (television, video games and computer).

Currently, in the municipalities, there is a decrease in opportunities to perform activities considered healthy, whether for transportation or leisure². In addition to this, there is an exaggerated supply of high-calorie foods, resulting in a negative influence on a healthy lifestyle, which is often aggravated by more time being spent in front of screens or in sedentary leisure activities¹⁵.

The media, assessed in this study as access to electronic devices, also contributes to the obesogenic environment. It is expected that the parenting style and availability of food at home will modulate eating behavior^{16,17}. There are several studies that indicate an association between longer exposure to the media and the occurrence of unfavorable health behaviors^{18,19}. The risk associated with this practice is due to greater exposure to advertising campaigns in the food industries, generally spreading high-calorie foods with low nutritional value^{20,21}. Also, there is the fact that the longer children are exposed to the media, especially television, the more often they consume caloric foods, and this can contribute to sedimentation throughout life unhealthy eating behavior²².

In this research there was a proportion of children who ate meals in front of the television, although this frequency in daily life can be considered small (30%), the cumulative effect can contribute to the positive association between eating while watching TV and children's eating disorders. In this sense, there is a systematic review that found that eating while watching television is associated with a worse quality of diet among children, including more frequent consumption of sugary drinks, foods with a high fat and sugar content and lower intake of fruits and vegetables²³.

When analyzing eating behaviors of children and adolescents, from the perspective of the 6Cs²⁴ ecological model, considering as a proxy for family influences, parenting styles are considered an important determinant for the establishment of the way children eat, because the way parents dealing with the child contributes to their socialization process and, in particular, with regard to the formation of eating behavior^{25,26}.

The research findings show a significant frequency of neglectful fathers and mothers, assessed according to their children's perception, similar to what was reported in another study²⁷, which used the form of classification of similar parenting styles. In this type of relationship between parents and children, coldness and detachment are predominant characteristics, such as lack of sensitivity towards the child's needs. Generally, these parents have an absence of rules and requirements in the home environment¹⁸.

There was an association between negligent parental parenting styles and low availability of ultra-processed foods in relation to other PEs. A possible explanation is the fact that parenting styles have been evaluated from the children's perception. It is described that

children in this age group tend to have a difficult relationship with their parents and can issue more "harsh" assessments²⁸.

Regarding maternal parenting styles, an association was observed between permissiveness and high availability of minimally processed foods, different from what was found in another investigation²⁹. This raises the question that despite being the mother, most of the time, the one who makes decisions regarding the purchase of food, there are factors beyond parenting style that affect this decision, such as socioeconomic, the influence of food marketing, and others.

In another context, a study analyzed³⁰ the home environment and found that adolescents belonging to families of low socioeconomic status reported having greater availability of ultra-processed foods, pointing out the influence of socioeconomic conditions on the acquisition of these foods.

The averages obtained in the subscales of eating behavior through the CEBQ were similar to a work already published³, except for "slow intake" and "response to satiety", which were lower than in this study. This divergence can be explained by the fact that the referred study was with children of a younger age group, considering that these subscales translate better behaviors for older children⁵.

There was no statistical significance in the relationship between eating behavior and parenting styles. Regarding parenting styles, there was a greater frequency of authoritarian and negligent parents, characterizing an inappropriate behavior in view of the wishes and actions of the child and adolescent²⁶. Parents would act in order to impose their will or to fulfill their children's wishes and wishes and not as a model of reciprocity or as an agent responsible for shaping and directing behavior²⁶. In addition to being permissive or negligent parents, the influence of the environment in which the child is inserted, as well as that of the media the child uses, start to play an even more significant role throughout life¹⁸.

It is noteworthy that there are other factors involved in the establishment of infantile eating behavior that were not addressed in the present study, among these, genetic, psychological and emotional aspects³⁰.

CONCLUSION

The research pointed out items that suggest an obesogenic environment among students and early exposure to the media. There was a negative influence of permissive parenting styles, availability of ultra-processed foods as well as the influence of permissive mothers and emotional food intake among adolescents.

The study presented as limitations the possibility that parents hid some reality for fear of judgments; and the recall aspect, due to the fact that some questions were about foods acquired in the last 30 days, which may lead to failures in the reliability of the data. In addition, this type of cross-sectional study does not allow for causality analysis, so there is no way to identify a causal factor between exposures.

Maternal and/or paternal parenting styles are important for shaping children's behavior, but they are not enough. The behavior suffers from genetic, epigenetic and environmental influences and to understand it there is a need for interdisciplinary studies.

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CONTRIBUTIONS

Giselia Alves Pontes da Silva participated in the conception, writing and revision. **Rafael Miranda Tassitano** collaborated with data collection and data analysis. **Rafaela Ramos Dantas** contributed with the conception, data collection and data analysis. **Priscilla Yvelin Barros de Melo** worked on data collection, data analysis and writing.

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