

Breastmilk Substitutes Marketing Violations and Associated Factors in Rio de Janeiro, Brazil

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Abstract

Background: Aiming to protect breastfeeding, the World Health Organization released the *International Code of Marketing of Breastmilk Substitutes* in 1981, which was adopted by the vast majority of the 118 member countries, including Brazil. The Brazilian Code regulates the marketing of infant formulas, baby bottles, teats, pacifiers, milk, and processed complementary food.

Research aims: (1) To determine if retail stores had violated the Brazilian Code and (2) to analyze factors associated with these violations.

Methods: This cross-sectional study included all drugstores, supermarkets, and department stores in the Southern Zone of Rio de Janeiro City, Brazil. Trained health professionals observed retail stores for marketed products and violations of the Brazilian Code and then interviewed their managers. Factors associated with the retail stores violating the Brazilian Code (outcome) were analyzed, employing a logistic regression model with 95% Confidence Interval.

Results: Of the retail stores ($N = 349$) evaluated, 62.8% violated the Brazilian Code, ranging from 1 to 37 violations per retail store. The most common promotion strategies were price discounts and special displays. Retail stores being part of a chain store ($aOR = 4.59$) and their manager receiving visits from industry business representatives ($aOR = 2.14$) were associated with the presence of violations.

Conclusions: The prevalence of Brazilian Code violations was high, especially in chain stores. The association between regular visits by industry representatives and violations suggests an indirect influence of manufacturers on the promotion of human milk substitutes. We recommend strengthening compliance with the Brazilian Code through calling on governmental surveillance agencies and civil society mobilization.

Keywords

breastfeeding, infant nutrition, infant formula, International Code of Marketing of Breastmilk Substitutes, program evaluation

Resumo

Introdução: Visando proteger a amamentação, a Organização Mundial da Saúde lançou em 1981 o Código Internacional de Comercialização de Substitutos do Leite Materno, adotado pela grande maioria dos 118 países membros, incluindo o Brasil. A Norma Brasileira regula a comercialização de fórmulas infantis, mamadeiras, bicos, chupetas, leites e alimentos de transição. **Objetivo:** investigar se estabelecimentos comerciais violaram a Norma Brasileira e analisar fatores associados a essas violações. **Métodos:** estudo transversal que abrangeu todas as drogarias, supermercados e lojas de departamento da Zona Sul da cidade do Rio de Janeiro, Brasil. Profissionais de saúde treinados observaram os estabelecimentos quanto a produtos comercializados e violações à Norma Brasileira e entrevistaram seus gerentes. Os fatores associados ao estabelecimento comercial com violação à Norma Brasileira (desfecho) foram analisados por modelo de regressão logística com intervalo de confiança de 95%. **Resultados:** dos 349 estabelecimentos avaliados, 62,8% violaram a Norma Brasileira, variando de 1 a 37 violações por estabelecimento. As estratégias de promoção mais comuns foram descontos nos preços e exposições especiais. O estabelecimento fazer parte de uma rede ($ORa=4,59$) e seu gerente receber visitas de representantes comerciais da indústria ($ORa=2,14$) se mostraram associados à violação. **Conclusões:** A prevalência de violações à Norma Brasileira foi alta, especialmente em redes de estabelecimentos. A associação entre visitas regulares de representantes da indústria e violações sugere uma influência indireta dos fabricantes na promoção de substitutos do leite materno. Recomendamos fortalecer o cumprimento à Norma Brasileira por meio da fiscalização por agências governamentais e da mobilização da sociedade civil.

Back translated by Ana Laura Grazziotin, PhD

Background

Exclusive breastfeeding is the recommended feeding practice for child growth and development during the first 6 months of life and should be followed by breastfeeding complemented by healthy foods for up to 2 years or more (World Health Organization [WHO], 2008). However, multinational companies that produce baby formula, infant food, baby bottles, teats, and pacifiers continuously develop marketing strategies that can adversely affect mothers' choices about how to feed their babies, impeding them from enjoying the benefits of breastfeeding. Total global sales of milk-based formulas are continuously growing (Baker et al., 2016). The marketing of breastmilk substitutes ensures an annual global economic growth of nearly 10%, with an estimated sale amount of US\$70 billion in 2019, and economic losses related to non-breastfeeding reaching 0.5% of world gross national income (Rollins et al., 2016).

In 1981, the WHO and the United Nations Children's Fund (UNICEF) created the *International Code of Marketing of Breastmilk Substitutes* (IC), aiming to protect breastfeeding by regulating the marketing of these products (World Health Organization [WHO], 1981). In total, 135 countries have implemented legal measures related to the IC, but only 39 countries, including Brazil, have adopted all Code-related legal provisions (Pan American Health Organization [PAHO], 2016). Breastfeeding is considered to be a human right and the IC was developed to ensure an environment that enables women to carry it out (Grummer-Strawn et al., 2017). It was the basis for the elaboration of the first marketing regulation in Brazil: *The Brazilian Code*, a Ministry of Health Act published in 1988 and subsequently revised in 1992, 2001, and 2002, to include not only infant formulas and baby bottles, but also pacifiers and food for toddlers, and assigning oversight to the Brazilian Health Surveillance Agency. *The Brazilian Code* is known as "Norma Brasileira de Comercialização de Alimentos para Lactentes e Crianças de Primeira Infância, Bicos, Chupetas e Mamadeiras" (NBCAL) in Brazil (Prado &

Key Messages

- Thirty years into the Brazilian legislation to regulate the marketing of human milk substitutes, researchers have not analyzed the factors associated with violations of the Brazilian Code.
- Almost two thirds of the retail stores that sold human milk substitutes violated the Brazilian Code; factors associated with these breeches were chain retail stores and regular visits from industry business representatives to retail store managers.
- Employing analytic tools allowed us to evaluate factors associated with retail stores having Brazilian Code violations and to explore why violations were so prevalent.

Rinaldi, 2020). In 2006, after several years of debate in the Brazilian Congress and Senate, and thanks to the lobbying of pro-breastfeeding NGOs (mainly the International Baby-Food Action Network [IBFAN]), and researchers, the Brazilian Code became a national law, with higher legal binding than the previous Acts. This legislation prohibits promotion of infant formulas, baby bottles, teats, and pacifiers either by manufacturers or by retail stores. The promotion of regular milk and commercial complementary foods may only be carried out when accompanied by an informative statement from the Brazilian Ministry of Health about the benefits of breastfeeding (*Regulamenta a comercialização de alimentos para lactentes e crianças de primeira infância e também a de produtos de puericultura correlatos* - Law nº 11265, 2006).

Systematic evaluations of IC compliance, with indicators to compare results over time and between different places, and evaluation of factors that may contribute to illegal commercialization, have never been conducted in Brazil and are necessary in order to provide stakeholders with information to facilitate the allocation of resources protecting breastfeeding. We aimed to (1) determine if retail stores had violated the Brazilian Code and to (2) analyze factors associated with these violations.

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Methods

Design

A cross-sectional design was used to explore the marketing practices of a cohort of retail stores, using observation and a survey conducted by an interviewer. This study was part of a larger research project “*Evaluation of the Compliance with the Brazilian Code of Marketing of Infant and Toddlers Food and Related Childcare Products in Commercial Establishments and Health Services.*” It was the first of a series of research studies conducted in Rio de Janeiro and other Brazilian cities with the purpose of developing academic questionnaires and indicators about compliance with the Brazilian Code. The study was approved by the Institutional Review Board of the Fluminense Federal University under Protocol No. 1.878.013/2016.

Setting

Rio de Janeiro is the second biggest city in Brazil, famous for its carnival. It is located in the Southeastern Brazilian Region, has about 6,300,000 inhabitants, of which 638,000 live in the Southern Zone of the city, where the present study took place. Mountains and the sea surround this zone, which was selected because it has population segments from different social classes, distributed in 18 high-income, middle-income, and low-income (slums) neighborhoods. The “slums” are areas of irregular occupation, usually located on hills, with precarious urban infrastructure, where most of the low-income population live. Families in the Southern Zone of the city have access to three maternity hospitals, one of them Baby-Friendly, and to 14 public primary health care units, as well as to private services. In Brazil, the practice of breastfeeding has been improving since 1981, due to successful breastfeeding promotion policies, and the prevalence of exclusive breastfeeding among infants younger than 6 months has increased from 2.9% in 1986 to 36.6% in 2013. The prevalence of breastfeeding at 1 year of age rose from 22.7% in 1986 to 45.4% in 2013 (Boccolini et al., 2017).

Sample

The establishments included in the research were drugstores, supermarkets, and department stores that sold products covered by the Brazilian Code. The inclusion criteria for interviews was to be a manager of the retail store. For this study we have excluded the retail stores not registered in the National Juridical Registries, because these establishments are illegal and do not have a business license. No exclusion criteria for managers was applied.

All drugstores, supermarkets, and department stores in the Southern Zone of Rio de Janeiro City that sold products covered by the Brazilian Code were studied. A list containing the nominal list of drugstores, supermarkets, and department stores by neighborhood, as well as their addresses, was

compiled by consulting the website *Tele-Listas* (<http://www.telelistas.net/rj/rio+de+janeiro>), complemented by visiting the websites of major drugstores, supermarkets, and chain department stores, in order to carry out the mapping of all retail stores (Silva et al., 2020).

The final sample consisted of 349 retail stores, drugstores ($n = 237$), supermarkets ($n = 88$) and department stores ($n = 24$). Five department stores that did not sell products covered by the Brazilian Code were excluded from this sample and three drugstores not registered in the National Juridical Registries were also excluded. The survey was completed by 306 retail store managers, as 43 refused to participate. This sample was enough to detect a 1% error with 95% confidence interval considering a finite population of 350 retail stores and a 60% outcome prevalence.

Measurement

The sample unit was the retail store, and the outcome was the retail store presenting Brazilian Code violation(s), characterized as noncompliance with one or more items related to the commercial promotion of products and food within the scope of the Code. The data collection questionnaire was adapted from a form developed by the International Baby Food Action Network (IBFAN – Brasil, 2013), complemented with questions about products sold in the retail stores (see Supplemental Materials). This form was then adapted for electronic data collection. The electronic form included the identification of the type of retail store, the type of product related to the Brazilian Code sold in each store, and the type of violation to the Brazilian Code. The trade name of the product and its manufacturer were taken from the product label.

The characteristics of each retail store were observed and recorded in the electronic form, including the store type (drugstore, supermarket, or department store); if it belonged to any chain store (yes or no); and its location (regular neighborhood or “slum” community). All slums from the South Zone of Rio de Janeiro were studied. The comparison between slums and regular neighborhoods were an indirect way of checking for differences in the Brazilian Code violations according to socioeconomic strata.

Another structured electronic form was used for retail store managers (Table 1). First, managers were interviewed about their individual demographic characteristics, considering race, age, sex, and educational level. All managers replied to these questions, even those who declined to participate in the full manager questionnaire. Next, the managers were asked about their knowledge of the Brazilian Code and about the retail store’s practices, including the occurrence and frequency of in store visits to the manager by company representatives; the name of the companies that visit the store; and if the manager received guidance or advice from company representatives about how to sell or display their

Table 1. Variables and Definitions of Data Collected From Store Managers.

Variables	Definition/Categories of Variable
Race	Skin color declared by the manager: white/black/brown/other
Age	Less than 30 years old/31–50 years old/51 years old or more
Sex	Male/female
Educational level	Less than 11 years of formal study/secondary school
Knows the Brazilian Code	Knowledge declared by the manager: yes/more or less/no
Frequency of visits from company representatives	Daily/weekly/biweekly/monthly/sporadically/never
Which companies visit the retail store	Nestlé/Danone/Mead Johnson/Abbott/Other (specify) Lillo/Kuka/MAM/Nuk/Avent/Baby Go/Other (specify)
Receives guidance from company representatives	Yes/no

products in the store or how to provide mothers with information about the products (yes or no).

According to Brazilian Code legislation, we considered two major groups and five subgroups (Table 2). In Group A, we included infant foods and products with forbidden sales promotions (i.e., infant formulas; infant formulas for specific dietary therapy needs; baby bottles, teats and pacifiers). In Group B, we included foods with authorized sales promotions, provided they are accompanied by a warning statement (i.e., milks and milk-based compounds; commercial complementary foods).

The Brazilian Code violation includes any of the three categories of promotions in Group A products, namely: (a) price discounts or offers (discounts); (b) special displays on gondola end caps, or highlighted displays (special displays); (c) distribution of free samples or gifts (giveaways). In Group B products, infringement was considered when those same categories of promotions were not accompanied by the mandatory warning statements (Table 2). Those statements need to be part of the product label and to be displayed on the shelves, with the following attributes; legible, in bold characters, framed, and next to the product sold under a

Table 2. Products Regulated by the Brazilian Code (NBCAL) and Observed Categories of Promotion in Retail Stores.

Variable	Definition
Group A. Infant foods and products with forbidden sales promotions	
1. Infant formula	Industrialized formulas for feeding infants from 0–5 months and 29 days and follow-on formulas for feeding infants from 6–11 months and 29 days in total or partial replacement of human milk.
2. Infant formula for specific dietary therapy needs	Industrialized infant formulas with a composition to meet temporary or permanent physiological or pathological needs.
3. Baby bottle, teat; pacifier	Items used as vehicles of infant formulas, milks or other liquid/pasty foods; artificial teat intended for sucking without administering food, medicine, or liquid, as a pacifier.
Group B. Infant and toddlers' foods with authorized sales promotion if accompanied by a warning statement	
4. Milk and milk-based compounds ^a	Liquid or powdered milks, modified or integral, from animal origin (like cow's milk), or vegetable origin (like soy milk), growing-up formulas for children 1–3 years old, and powdered milk-based compounds with vegetable oil and carbohydrates.
5. Commercial complementary foods ^b	Industrialized food for direct use or for use in homemade preparations, as a complement to human milk or infant formulas, introduced in infant and toddlers' feeding to promote a progressive adaptation to common foods (like baby food, soups, and children's cereals).
Categories of promotion	
Discount	Discounts on individual products, offers at a lower price, discount coupons, progressive discounts, and other kinds of price reduction.
Special display	Any way of displaying a product in order to make it stand out from others, like in a shop window, on a gondola end cap, stacking products in the shape of a pyramid or island, or decorating shelves.
Sample or gift (giveaways)	Unit of a product within the scope of NBCAL given free of charge or the offer of a toy, ornament, or other object by the retail store linked to the purchase of a product.

^aWarning statement requested: "The Ministry of Health informs breastfeeding prevents infections and allergies and is recommended up to 2 years or more."

^bWarning statement requested: "The Ministry of Health informs after 6 months of age, continue to breastfeed your child and offer new foods."

promotion (*Comercialização de alimentos para lactentes e crianças de primeira infância e de produtos de puericultura correlatos* - Act n° 8552, 2015).

A pilot study was carried out in February 2017, in the city of Niterói and the Northern Zone districts of Rio de Janeiro, and adjustments on field strategy and data collection instruments were made, especially regarding questionnaire “jumps” and sequence. The content validity of the final questionnaire was assessed by a panel of experts in the field from different parts of Brazil.

Violation Score

Regarding the outcome, each product for sale that had one or more violations to the Brazilian Code (discounts, special displays, or giveaways) was counted as one violation. Finally, the number of different products with one or more violations were attributed to the retail stores (violation score), ranging from zero (no violations) to infinite (total number of products observed with violations). This violation score was then dichotomized into “violation” (the retail store was selling one or more products with violations to the Brazilian Code) or “no violation.”

Data Collection

Seven health professionals, most of them nutritionists and all trained in the Brazilian Code 24 Hour Course, administered by the Rio de Janeiro State Health Secretariat in order to identify Code violations, collected data between March–April 2017. The researcher responsible for the project instructed these interviewers to collect data electronically using a mobile device with a 3G mobile data connection and supervised them.

Confidentiality, anonymity, autonomy, and freedom to refuse participation were guaranteed to the store managers. Respondents were informed about the aims of the research and that no penalty would be imposed if the retail store was not complying with the Law. Verbal consent was obtained from all respondents.

Distinct neighborhoods were allocated to each interviewer to avoid overlapping in data collection. The interviewers visited all initially listed retail stores that sold products covered by the Brazilian Code. As interviewers went through the streets of the corresponding neighborhoods during fieldwork, listed but nonexistent retail stores were excluded, and unlisted retail stores found during the survey period were included. Interviewers observed all retail stores for marketed products and assessed compliance with the Brazilian Code. In each retail store, after observing the products and the violations, the interviewer asked the manager permission for an interview and if the manager consented, asked the questions. The participant’s responses were entered in the online questionnaire. No personal information was requested (e.g., name and address) and all data were encrypted and stored in Oswaldo Cruz Foundation safe server.

After entering the observation data and interviewing the manager, the interviewers reviewed the answers to check for completeness and sent the data via the internet, building a database. (More details regarding data collection can be obtained in Silva et al., 2020)

Data Analysis

The data were exported and analyzed using SPSS (Version 21). Initially, the frequencies of the attributes of the retail stores and managers, the subgroups of foods and products sold by type of retail store, the outcome by type of product, and the promotion strategy by type of retail store were described.

In order to analyze the frequency of violations by each product subgroup, the total number of retail stores with violation(s) was considered in the numerator and the total number of retail stores that sold products from that subgroup in the denominator (since many retail stores did not sell one or more products from the five subgroups), generating a final frequency by subgroup lower than the total number of retail stores observed.

The next step consisted of estimating logistic regression models, with an alpha of 5%, performed separately for each variable, having the violation of the Brazilian Code as the outcome. Since “no violation” was the reference, the crude Odds Ratio expresses the chance of violation. The variables, categories, and reference index considered in this analysis stage were: “type of retail store”: supermarket, department store, and drug-store (reference); “retail store being part of a chain”: yes and no (“no” as reference); “location”: regular neighborhood (reference) and slum community; “the store manager knows the Brazilian Code”: yes and more or less/no (reference); “the manager of the retail store receives visits from company business representatives”: yes and no (reference); and “the manager of the retail store receives guidance from company business representatives”: yes and no (reference).

The final step consisted of estimating an adjusted logistic regression model, with a Confidence Interval of 95%, considering all variables simultaneously. The variables that did not achieved a *p*-value equal to or lower than .05 were excluded manually one by one. The final model had only those variables with a *p*-value \leq .05. The exception was “type of retail store,” which was maintained in the final model even though it did not reach a level of significance less than or equal to 5%, as it was assumed that different types of retail stores have different commercial practices.

Results

Characteristics of the Sample

From the 352 retail stores evaluated in Rio de Janeiro’s Southern Zone that sold one or more infant foods covered by the Brazilian Code, 349 were registered in the National Juridical Registries. Considering the characteristics of retail

Table 3. Characteristics of Retail Stores and Their Managers (N = 349).

Characteristic	n (%)
Type of retail store	
Drugstore	237 (67.9)
Supermarket	88 (25.2)
Department store	24 (6.9)
The retail store is part of a chain	
Yes	274 (78.5)
No	75 (21.5)
Location	
Regular neighborhood	324 (92.8)
Slum community	25 (7.2)
Manager's educational level	
Up to incomplete secondary school (< 11 years)	77 (22.1)
Secondary school and over	272 (77.9)
Manager knows the Brazilian Code	
Yes	77 (25.2)
More or less/no	229 (74.8)
Retail store receives visits from company business representatives	
Yes	251 (82.3)
No	54 (17.7)
Retail store receives guidance from company business representatives	
Yes	48 (15.8)
No	256 (84.2)
Retail store violates the Brazilian Code	
Yes	219 (62.8)
No	130 (37.2)

Note. Missing values: Manager knows the Brazilian Code = 43; Retail store receives visits from company business representatives = 44; Retail store receives guidance from company business representatives = 45.

stores, the most frequent retail stores found were drugstores (Table 3). More than three-quarters of the retail stores belonged to a chain store and less than one-tenth were in

slum communities. Among all retail stores, 62.8% violated the Brazilian Code. Of the retail store managers 12.3% refused to participate in the survey, mainly those responsible for department stores and respondents with lower educational levels (up to incomplete secondary school—less than 11 years). The products most commonly sold by these retail stores were milk and milk-based compounds, followed by commercial complementary food, infant formula, bottles, teats and pacifiers, and formula for specific dietary therapy needs. Baby bottles, teats, and pacifiers were mostly sold in drugstores and department stores. Department stores did not sell infant formulas (Table 4).

Characteristics of Violations

Among the retail stores that marketed milk and milk-based compounds, 58.5% violated the Brazilian Code. Nearly a quarter of retail stores that sold commercial complementary foods violated the Brazilian Code, either because the mandatory Ministry of Health's informative statement was missing, or because this statement was not placed near the sales promotion, or because it was not noticeable. Of the retail stores that sold baby bottles, teats, and pacifiers, 9.6% had sales promotions linked to these products, and 16.1% of those who sold infant formulas promoted them. The number of violations per store varied, from one up to 18 infant formulas being sold with commercial promotion. The total number of violations per retail store ranged from 1 to 37 (Table 5).

The most commonly found manufacturers of baby bottles, teats, and pacifiers were Lillo, Kuka, MAM, and Nuk, with enticing words written in English on their labels (e.g., "creative," "orthodontic," "watercolor," "first choice," "funny," and "magic design"). Nestlé and Danone were the main producers of infant formula and of processed complementary food marketed in retail stores. The regular milk sold was derived from dozens of manufacturers, in both powder and liquid forms. The milk-based compounds were sold in powder form, produced by infant formula companies.

Regarding the sales promotion strategies that violated the Brazilian Code, the most common was price discounts (53.6%), for example, discounts on individual items,

Table 4. Frequency Distribution of Drugstores, Supermarkets, and Department Stores That Sold Products Related to the Brazilian Code Grouped by Product Type (N = 349).

Products	Drugstores	Supermarkets	Stores	Total
	n = 237 (67.9%)	n = 88 (25.2%)	n = 24 (6.9%)	N = 349 (100%)
	n (%)	n (%)	n (%)	n (%)
Infant formula	228 (96.2)	51 (58.0)	0 (0.0)	279 (79.9)
Formula for specific dietary therapy needs	197 (83.1)	21 (23.9)	0 (0.0)	218 (62.5)
Baby bottles, teats, and pacifiers	223 (94.1)	7 (8.0)	21 (87.5)	251 (71.9)
Milk and milk-based compounds	229 (96.6)	88 (100)	18 (75.0)	335 (96.0)
Commercial complementary foods	220 (92.8)	87 (98.9)	6 (25.0)	313 (89.7)

Table 5. Frequency Distribution of Violations of the Brazilian Code Among Retail Stores by Type of Product Marketed (N = 349).

Products	Selling With Violation	Selling Without Violation	Total	Violations/Store Range: 1–37
	n = 219 (62.8%)	n = 130 (37.2%)	N = 349 (100%)	
	n (%)	n (%)	n (%)	
Infant formula	45 (16.1)	234 (83.9)	279 (100)	From 1–18
Formula for specific dietary therapy needs	19 (8.7)	199 (91.3)	218 (100)	From 1–3
Baby bottles, teats, and pacifiers	24 (9.6)	227 (90.4)	251 (100)	From 1–9
Milk and milk-based compounds	196 (58.5)	139 (41.5)	335 (100)	From 1–8
Commercial complementary foods	71 (22.7)	242 (77.3)	313 (100)	From 1–4

discounts for buying multiple items, and discount coupons, followed by special displays in shop windows, gondola end caps, and stacking products in pyramid shapes (Table 6).

Factors Associated With the Presence of Violations

Considering the adjusted logistic regression model, the factors that were statistically associated with the presence of violations were the retail stores that were part of a chain (aOR = 4.59) and the stores which reported that the manager had received one or more visits from a business representative of a manufacturer of Brazilian Code covered products (aOR = 2.14) (Table 7). Of the retail stores, drugstores and supermarkets were the worst offenders, with the most violations; although, this difference did not reach statistical significance.

Discussion

Although Brazil has advanced legislation regulating the commercial promotion of infant foods, baby bottles, teats, and pacifiers for over 30 years, almost two-thirds of Rio de Janeiro's Southern Zone retail stores violated the Brazilian Code (NBCAL). Chain store establishments were 4 times more likely to violate this legislation than others, and those that received regular visits from business representatives of breastmilk substitutes' companies were twice as likely to violate it.

This is not a new or unknown commercial legislation: the Brazilian Code has banned any form of commercial promotion of infant formulas, baby bottles, and teats in Brazil since

its first version, dated 1988 (*Norma brasileira para comercialização de alimentos para lactentes*- Act nº5, 1988). An in-depth description of Brazilian Code violations regarding infant formula found that Nestlé and Danone were the two companies that most frequently had products infringing the national Law (Silva et al., 2020).

The seriousness of these violations is clear: these products compete directly with breastfeeding during the first 6 months of life, when exclusive breastfeeding is strongly recommended to prevent child morbidity and mortality due to diarrhea, pneumonia, and other infections (Victora et al., 2016). In Brazil the median exclusive breastfeeding duration is still low at 2.2 months (Ministério da Saúde do Brasil, 2009), another reason to better enforce the existing legislation. Violations are not an exclusively Brazilian reality. The IC also bans the promotion of these products: a recent report identified 792 IC violations from 79 countries by 28 companies (IBFAN – ICDC, 2017).

The high magnitude of the association found between chain drugstores and the presence of violations to the Brazilian Code can be explained by the fact that being part of a chain store franchise allows those commercial companies to execute larger purchase volume, negotiate directly with the industry without the intermediation of distributors, and maximize their profit with cost savings. Companies can increase their media participation and expand their market power through collaborative action strategies (e.g., promotional inserts, loyalty cards, advertising sharing, and providing salespersons employed by the stores with further training courses). Human resources training programs are commonly

Table 6. Sales Promotion Strategies that Violate the Brazilian Code by Type of Retail Store (N = 349).

Sales promotion strategy	Drugstore	Supermarket	Department Store	Total
	n = 237	n = 88	n = 24	N = 349
	n (%)	n (%)	n (%)	n (%)
Price discount	124 (52.3)	52 (59.1)	11 (45.8)	187 (53.6)
Special display	94 (39.7)	23 (26.1)	0 (0)	117 (33.5)
Giveaway	6 (2.5)	0 (0)	0 (0)	6 (1.7)

Table 7. Prevalence and Adjusted Odds Ratios of Violation to the Brazilian Code as per Characteristics of the Retail Stores and Their Managers (N = 305).

Characteristic	With Violation N = 349 (100%)		Crude OR	p	Adjusted OR ^d	95% CI
	n (%)					
Type of retail store						
Drugstore	52 (64.1)		1		1	
Supermarket	56 (63.6)		0.979	.934	0.943	[0.527, 1.687]
Department store	11 (45.8)		0.473	.083	0.488	[0.145, 1.651]
The retail store is part of a chain						
Yes	193 (70.4)		4.491	< .001	4.588	[2.588, 8.228]
No	26 (34.7)		1		1	
Location						
Regular neighborhood	210 (64.8)		1		1	
Slum community	9 (36.0)		0.305	.006		
Manager knows the Brazilian Code						
Yes	55 (71.4)		1.649	.081		
More or less/no	138 (60.3)		1			
Retail store receives visits from company business representatives						
Yes	169 (67.3)		2.778	< .001	2.136	[1.114, 4.097]
No	23 (42.6)		1		1	
Retail store receives guidance from company business representatives						
Yes	36 (75.0)		1.955	.060		
No	155 (60.5)		1			

Note. Missing values: Manager knows the Brazilian Code = 43; Retail store receives visits from company business representatives = 44; Retail store receives guidance from company business representatives = 45. Logistic regression model, with alpha = 0.05, adjusted for all variables with a significance level less than or equal to 20% in the bivariate analysis (Crude OR).

sponsored and supported by industries (Soares et al., 2016). Thus, the strong association found in our study may reflect the advantages offered by manufacturers of breastmilk substitutes in return for the commercial contracts.

Product price discounts and product placement at strategic locations in commercial retail stores set up essential features to stimulate customer buying and, in this investigation, they were the most widely used features in trade promotions, violating the Brazilian Code. The arrangement of products also stood out in the preference of 424 clients interviewed in chain drugstores in Minas Gerais, a state in the southeast region of the country, among other strategies (e.g., the variety of brands available for sale and product price discounts; Souza & Lara, 2011).

Drugstores frequently violated the Brazilian health norms of product sales, even of highly regulated products like medicines, which are linked to promotional materials (Galato et al., 2011). Price promotion strategies are effective in building customer loyalty. In a qualitative study conducted with health surveillance professionals in Salvador, in the northeast region of Brazil, researchers reported that despite extensive regulation of these retail stores, the governmental regulatory and surveillance agency, with a law enforcement role in drugstore over-sights, faced barriers that hampered its efficiency, such as the recurrence of infringement of legislation by the same

drugstore (Bastos et al., 2011). Other hurdles reported were the poor infrastructure available for health care surveillance, lack of standardized surveillance procedures, and low levels of social control over health care surveillance (Bastos et al., 2011).

The Brazilian Health Surveillance Agency, which directly oversees the Brazilian Code, has several barriers that hamper the efficacy of its enforcement procedures. A study by Barennes et al. (2016) stated that it is crucial to combine strong political commitment and leadership with strict national regulations, imposing penalties for all violators in order to enforce the law. Another segment that could counteract the power of the industry are the consumers. The Brazilian Code is not well known to the general population, and retail stores' customers may come under indirect pressure from industries because sales representatives can also contact them representatives. Robinson et al. (2019) compared the IC implementation in three Asian countries, and concluded that IC implementation depends on each country's engagement, the strategies adopted, and the presence of enabling factors. Brazil is engaged in breastfeeding protection and has strict national regulations, but it needs to enforce its surveillance (Prado & Rinaldi, 2020).

It is noteworthy that the frequent presence of representatives of human-milk substitutes companies in drugstores has been a strategy for indirectly reaching the target audience (women, infants, and toddlers) through their staff. A descriptive study conducted by Silva et al. (2020) found that Nestlé was the infant formula company that most frequently visited retail stores' managers, followed by Danone. Representatives are often empowered by industries to act as "consultants" to clients (Soares et al., 2016). This articulated approach of the industry, which also uses the influence of pediatricians (Rea & Toma, 2000), has been a tactic to bypass the restrictions imposed by the Brazilian Code (Grando, 2011).

Four key companies (Nestlé, Danone, Mead-Johnson, and Abbot) were responsible for the high number of violations per retail store regarding the sale of infant formula, and this also seems to reflect the wide variety of attractive trade names in the domestic market (e.g., premium, comfort, active, gentlease, pro-expert, pro future and supreme; Silva et al., 2020). Those words have no meaning in Portuguese and do not correspond to any specific nutrient added to the formula, but give the impression of superiority over other products or milks for Portuguese speakers. Despite diversified brands, few characteristics differentiate the products from each other, since legislation standardizes identity, composition, quality, and safety requirements (Ministério da Saúde do Brasil, 2011). This brand diversification is another feature used by globalized industries to increase sales and expand the consumer market (Piwoz & Huffman, 2015).

The cow's milk-based compounds' packaging was very similar to that of infant formula and was produced by the same four major companies, implying "cross-promotion" strategies, where infant formula labels promote the consumption of follow-on milks and the cow's milk-based compounds of their own companies/brands. The WHO and UNICEF (2019) define cross-promotion as a threat to breastfeeding and infant health, since mothers can get confused and feed young infants with products that do not meet their nutritional needs. The practice of cross-promotion should be forbidden but it is not yet regulated by the Brazilian Code.

Recommendations

Our findings have implications for retail stores, for the chains that coordinate them, for public health professionals, for the companies that produce human-milk substitutes and for society in general. Far from there being a simple solution to this complex problem, action is required from the government and from society. On one hand, governmental supervision, through health surveillance agencies, should be strengthened, with fines and punishments (provided by Brazilian Laws) being applied for testified violations of the Brazilian Code. On the other hand, it is necessary to raise awareness about the relevance of the Brazilian Code and to mobilize health professionals, consumer groups, civil society, and individuals to monitor it in order to protect mothers and families from the marketing of human-milk

substitutes. Human resources training programs cannot be sponsored or supported by industries anymore. Related conflicts of interest are evident and have implications for public health, implying interference in mothers' feeding choices. Government investment in breastfeeding protection is urgently needed.

Future studies are needed to deepen the knowledge about the complex relationship between the retail store managers, the infant food industry, and the consumers, and about how families can be affected by the marketing strategies present in retail stores. Qualitative research in this field might be interesting, considering retail stores' managers and mothers as participants.

Limitations

The cross-sectional design used in this study can be considered a limitation, since all the dynamism of promotions and the seasonality of some products (e.g., less cow's milk is produced in summer) could not be measured due the study design. Another limitation was the relatively high refusal of managers to be interviewed, which may have generated a selection bias regarding the answers that those interviewed provided. The research questionnaire validation is another important issue, and efforts in this direction are being carried out by the authors. The profile of interviewed and non-interviewed managers did not differ in demographic characteristics (e.g., sex and race) and was similarly distributed among retail stores with and without violations. However, more refusals were recorded in retail stores whose managers had a lower educational level and in department stores. There was a possibility of non-differential outcome misclassification as data collectors may have missed an infraction, or may have classified a product being sold as violating the Brazilian Code when there was no infraction.

Conclusions

We conclude that violations to the Brazilian Code were very frequent, especially in chain stores and in retail stores visited regularly by representatives of breastmilk substitutes corporations. These multinational companies seem to have a high bargaining power over the retail stores, negotiating privileged exposure and discounts of their products, sales strategies that target growing their customer base and increasing sales and profits at global and national levels.


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Supplemental Material

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