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Food deserts in a health district of a Brazilian capital: a descriptive and exploratory study on the spatial distribution of commercial food establishments

Presença de desertos alimentares em um distrito sanitário de uma capital brasileira: um estudo descritivo e exploratório sobre a distribuição espacial de estabelecimentos comerciais de alimentos

Abstract

Introduction: The communities' food environment can positively or negatively influence access to quality food and consequently, people's health. Objective: Identify the presence of food deserts in a health district of a Brazilian capital. **Methods:** Descriptive, cross-sectional and exploratory study, using secondary data from different institutional sources to map the spatial distribution of food establishments such as restaurants, bakeries, supermarkets, minimarkets/grocery stores, fruit and vegetable stores, street vendors and cafeterias/fast food. The establishments were grouped into fresh, ultra-processed and mixed food categories, according to the predominance of the type of food offered. For the purpose of analysis, the density of fresh food establishments together with mixed food establishments per thousand inhabitants (as registered in the health centers) was calculated. **Results:** A total of 111 establishments were investigated, 20% selling fresh foods (healthy), 27% ultra-processed foods (unhealthy) and 53% considered mixed food sellers. **Conclusions:** Areas that can be considered food deserts were found, i.e. places where there is little (or absence) of fresh food supply, and consequently making access to healthy foods difficult.

Keywords: Food Environment. Food Deserts. Food Availability; Food Marketing.

Resumo

Introdução: O ambiente alimentar que a comunidade está inserida pode influenciar, positiva ou negativamente no acesso à alimentação de qualidade e consequentemente na sua saúde. **Objetivo:** Identificar a presença de desertos alimentares em um distrito sanitário de uma capital brasileira. **Métodos:** Estudo descritivo, transversal e exploratório, utilizando dados secundários de diferentes fontes institucionais para mapear a distribuição espacial de estabelecimentos de comercialização de alimentos: restaurantes, padarias, supermercados, minimercados/mercearias, hortifrutigranjeiros, vendedores ambulantes e lanchonetes/fast food. Os estabelecimentos foram agrupados nas categorias *in natura*, ultraprocessados e mistos, de acordo com a predominância do tipo de alimentos comercializados. Para a análise, a densidade de estabelecimentos *in natura* juntamente com os mistos por mil habitantes (usuários cadastrados nos centros de saúde) foram calculadas. **Resultados:** Foram investigados 111 estabelecimentos, sendo 20% que comercializavam alimentos *in natura* (saudáveis), 27% alimentos ultraprocessados (não saudáveis) e 53% considerados mistos. **Conclusões:** Foram

observadas áreas que podem ser consideradas desertos alimentares, locais onde há pouca (ou ausência) de oferta de alimentos *in natura*, e por consequência dificultando o acesso a alimentos saudáveis.

Palavras-chave: Ambiente Alimentar. Desertos Alimentares. Disponibilidade de Alimentos. Comercialização de alimentos. Abstract

INTRODUCTION

In Brazil, there is a high prevalence of families with limitations concerning the quantity, quality and regularity of access to food who live in situations of *Insegurança Alimentar e Nutricional* (InSAN, Food and Nutritional Insecurity).¹ According to data from the Household Budget Survey (HBS), in 2017-2018, 36.7% of the Brazilian population had some level of InSAN.² This situation worsened during the COVID-19 pandemic, involving 55.2% of Brazilian households at the end of 2020³ and increasing to 58.7% between November 2021 and April 2022.⁴

Complex multiplicity of economic, political, sociocultural and environmental factors is associated with the InSAN conditions in Brazil. Among such factors, the role played by the food environment has been highlighted in recent years.⁵⁻⁷ Thus, the growth of poverty and social vulnerability in Brazil, with the reduction in family purchasing power and the rise in food prices, has caused important changes in food consumption, especially due to the reduction in the access to nutritionally healthy foods and the growth of food environments rich in low-cost ultra-processed foods (UPF).⁸⁻¹⁰

It is noteworthy that, in 2017, the World Committee on Food Security released a conceptual model of food systems for diets and nutrition.¹¹ In this model, the food environment is portrayed as one of the components of the food system and presents elements that influence food choices, including the physical availability of food. In this connection, physical access and geographic distribution of food marketing establishments are discussed.

More recently Downs et al.¹² presented a more expanded approach to the concept of food environment, taking into account consumers' interface with the food system. Such system encompasses the availability, accessibility, convenience, promotion, quality and sustainability of food and beverages in wild, cultivated and built spaces that are influenced by the sociocultural and political environment and the ecosystems in which they are inserted.

On the other hand, Glanz et al.¹³ in a food environment conceptual model proposed in 2005, introduced the notion of community food environment, which considers establishments that provide food close to the geographic areas where people live, study and/or work; those outlets include supermarkets, grocery stores, fast food restaurants, restaurants, convenience stores, among others. This food environment can be investigated considering the quantity, type, location and accessibility of establishments¹³ and this environment can affect the quality of food, which, in turn, can influence the nutritional status of the individual and the community.^{14,15}

In this connection, several studies have demonstrated a relationship between the degree of food processing, obesity and related diseases.^{16,17} UPF are those foods produced by the food industry which have high energy density, higher sugar and salt content and are low in micronutrients and fibers.¹⁸ Therefore, when compared to fresh foods or minimally processed foods, UPF food consumption is associated with an increased risk of non-communicable diseases.^{19,20}

There are urban areas in which the community does not have access to establishments that sell healthy foods.²¹ These places, where there is little supply, or absence of healthy foods are called food deserts.²² There is no consensus in the literature surveyed regarding this and other concepts related to the food environment, which may have different forms of presentation and methodological measurement and analysis procedures, according to the characteristics investigated, such as objective, territory and target population. According to the United States Center for Disease Control (CDC),²² food deserts are characterized by places where people do not have physical access to fruits, vegetables, low-fat dairy products, whole grains and other markers of a healthy diet. In Brazil, the *Câmara Interministerial de Segurança Alimentar e Nutricional* (CAISAN, Interministerial Chamber of Food and Nutritional Security), considering the specificities of the country's food scenario, proposed a method for identifying food deserts.²³ This method consists in dividing the total number of establishments classified as healthy by ten

thousand inhabitants, and the geographical area that contains 25% or less healthy food establishments is considered a food desert.²³

The study of these food environments has taken place in different regions of the world,²⁴⁻²⁸ including Brazil.²⁹⁻³² Considering the importance of actions to promote healthy eating, we ought to know the status of the food environment in which health professionals are inserted, to better direct intersectoral actions and public policies to ensure the fulfillment of the human right to adequate and healthy food. Based on the above, the objective of this article was to identify the presence of food deserts in a health district of a Brazilian capital, using secondary data that allowed mapping the spatial (geographic) distribution of food marketing establishments.

METHODS

This is a descriptive, cross-sectional and exploratory study, which used secondary data from different institutional sources in Florianópolis, Santa Catarina.

Florianópolis, capital of the State of Santa Catarina, is located in the southern region of Brazil. The city population was estimated at 516,524 inhabitants³³ in 2021, and the Human Development Index was 0.847 (higher than the national average, which is 0.765).³⁴ Primary Health Care in the municipality is offered by Health Centers nested into four health districts. The South Health District comprises 13 health centers (Alto Ribeirão, Armação, Caieira da Barra do Sul, Campeche, Carianos, Costeira do Pirajubaé, Fazenda do Rio Tavares, Morro das Pedras, Pântano do Sul, Ribeirão da Ilha, Rio Tavares, Saco dos Limões and Tapera). Those health centers attend a total population estimated at 95,135 inhabitants in 2015.³⁴

Our study data collection was carried out from May to August 2020. To create the database, records obtained from the *Vigilância Sanitária e Ambiental da Secretaria Municipal de Saúde de Florianópolis* (VISA Florianópolis, Health and Environmental Surveillance of the Municipal Health Secretariat) were used; they contain information about food selling establishments, such as name, address (street, neighborhood and zip code) and type of establishment in accordance with the criteria established by the city of Florianópolis. The data collection was carried out throughout the municipality, and later a selection was made only of the geographic areas of the Southern Health District, that is, a standard buffer was not established around each health center, but rather the survey was carried out in the entire area covered by the thirteen health centers that are part of the Southern Health District. This selection was made considering the urban population growth of this municipality region, given that the transformation of the city into a tourist hub is enhancing the importance of the southern region of the island.³⁵ To avoid loss of information, data from different sources were triangulated to confirm and update the original data.

Data verification and updating strategies were used, as proposed by Neves et al.³⁶ and Corrêa et al.³⁰ namely:

(a) Consult data on food suppliers in the web telephone directory (<http://www.guiafacil.com/florianopolis/sc/>). The following descriptors were used for the research: restaurant, bakery, supermarket, minimarket, grocery store, fresh food producers, street vendors, cafeteria and fast food.

(b) Consultation of the street markets list on the Florianópolis municipality website, *Superintendência de Serviços Públicos* (SUSP, Superintendence of Public Services);

(c) Consultation on the map of organic food street markets available at <https://feirasorganicas.org.br/cidade/florianopolis-sc/>

(d) Visits to the official websites of fast food chains (<http://www.mcdonalds.com.br/>; <http://www.bobs.com.br/>; <http://www.burgerking.com.br/>; and <http://www.subway.com.br/>) and supermarkets (<http://www.supermercadosimperatriz.com.br/>; <http://www.angeloni.com.br/>; <http://www.superrosa.com.br/site/>; <http://www.hippo.com.br/>; hyperselect.com.br and http://www.bistek.com.br/rede_bistek) with points of sale in Florianópolis.

(e) Identification of food vendors in municipal shopping malls, consulting their official websites (<http://www.shoppingbeiramar.com.br/>; <http://www.floripashopping.com.br/>; <http://www.iguatemi.com.br/floriano> polis; <http://www.macshopping.com.br/loja/>; and <http://www.jurere.com.br/jos/>; <https://multiopenshopping.com.br/>).

The study database did not include establishments classified by VISA Florianópolis as bars, clubs, beverage stores, delivery-only food suppliers and food suppliers located in spaces that did not have food sales as their primary commercial purpose. These establishments cater specifically to certain audiences and are not freely accessed by the entire community, such as those located in schools, companies, universities, hotels, inns, gyms, sports clubs and beauty parlors.

A single list of food traders was developed and duplicates were excluded. Once the verification and/or update processes were completed, food vendors were grouped into seven categories: restaurants, bakeries, supermarkets, minimarkets/grocery stores, fruit and vegetable stores, street vendors, snack bars/fast food.

To help in the analysis, food sales establishments were regrouped into three categories: fresh food, UPF and mixed food outlets. For this classification, the criteria proposed by the *Câmara Interministerial de Segurança Alimentar e Nutricional* (CAISAN, Interministerial Chamber of Food and Nutritional Security), were used. Those criteria consider the percentage of food acquisition in each type of establishment. Outlets where the acquisition of fresh or minimally processed foods represents more than 50% of food purchases i.e. acquisition predominantly of healthy products, were grouped in the fresh food category. Establishments in which the acquisition of UPF represents more than 50%, that is, a predominant purchase of unhealthy products, were grouped in the UPF category. In turn, establishments where culinary preparations or processed foods purchases were predominant or where there is no predominance of acquisition of either fresh/minimally processed foods or ultra-processed foods were considered mixed foods outlets.²³

Therefore, the classification of establishments set out in our investigation considered as fresh food suppliers, a place where people purchase mostly fresh or minimally processed foods (fruit and vegetables); suppliers of mixed foods (fresh foods and UPF), where there are culinary preparations, such as restaurants, but there is also use/distribution of processed foods and UPF (restaurants, supermarkets, minimarkets/grocery stores and bakeries); and food suppliers mostly of UPF (snack bar/fast food, street vendors).²³

The Google Earth Pro® software (<https://www.google.com/earth/>) was used to map the establishments. Each food supplier was manually mapped to the corresponding address (by setting a map marker icon based on geographic coordinates). During this procedure, the Google Street View® feature was also used to more accurately identify the location of the food supplier. In Florianópolis, Google Street View® began capturing images in September 2011 (but did not cover the entire city). However, it has been expanded and updated to the present day.

During the manual localization stage, questions about the address, name, type of service and business opening date were clarified through additional consultations via the Internet (on the establishments' official websites and social networking sites). Investigations were also carried out to confirm the activity and type of service of the food seller, correcting the category in the spreadsheet, when necessary.

It is noteworthy that although the data collection was carried out throughout the municipality, only a section of the geographic area of the Southern Health District of the municipality was the object of this study.

The initial survey of the municipality of Florianópolis was based on information provided by the Health Surveillance Department and included a total of 2,787 food selling establishments. With the complementary search carried out in other data sources, 3,041 establishments were totaled in Florianópolis. However, only the establishments that would be used in the study were maintained: restaurants, bakeries, supermarkets, minimarkets/grocery stores, fruit and vegetable stores, street vendors and cafeterias/fast food. Duplicate establishments and those with incomplete information were excluded, resulting in 1,396 establishments of interest in the city of Florianópolis. A total of 5.1% (71) outlets were classified as establishments that predominantly sell fresh foods, 52.7% (736) establishments considered mixed food sellers and 42.2% (589) ultra-processed food selling establishments.

As the objective of the study was to identify establishments located in the southern health district, establishments belonging to other districts were excluded. Hence, 149 commercial food establishments that were located in the South Health District were considered. Out of these, 7 were not mapped due to address inconsistencies and 31 were not taken into account because, in the confirmation process, they were not located, their activities were suspended or had different classifications generating duplicate data.

In order to assess the locations with a lower supply of healthy food within the Southern Health District, the variable used was the density of “healthy” establishments per thousand inhabitants, that is, the ratio between the number of establishments selling fresh food, added to the number of mixed establishments divided by the number of users registered in each of the health centers multiplied by one thousand. The Brazilian method for classifying food deserts considers the density of establishments per 10 thousand inhabitants as a reference to adjust the magnitude of the variable, facilitating its understanding and comparison.²³ However, in this study we chose to adjust the magnitude of the variable per thousand inhabitants, considering the size of the population investigated. Density results are presented by distribution quartile with information on the 25th, 50th and 75th percentiles. Following CAISAN's suggestion,²³ those neighborhoods that were in the 25th percentile group were considered as locations with the worst access to healthy food within the municipality, the so-called “food deserts”, that is, locations in which access to healthy foods is restricted.²³

In the data analysis, descriptive statistics (absolute and relative frequency) were used using STATA software®.

RESULTS

Out of the 111 establishments investigated in the Southern Health District, 53% (59) were classified as establishments that sell mixed foods, 27% (30) processed foods and 20% (22) as establishments that predominantly sell fresh foods.

It is noteworthy that 19 establishments classified as fresh food suppliers did not open full-time (16 street markets and 3 organic food markets). These were available to the population on limited days and times, normally operating one day of the week and in just one shift. Table 1 presents the distribution of commercial food establishments by type and by territory covered by the Health Centers that make up the Southern Health District.

Table 1. Distribution of establishments selling predominantly fresh, mixed and ultra-processed foods by area covered by the health centers in the South District of Florianópolis, Santa Catarina, 2020.

Healthcare Center (HC)	Population served by HC		Fresh food establishments		Mixed establishments		Ultra-processed establishments		Total of establishments	
	N	%	N	%	N	%	N	%	N	%
Alto Ribeirão	4,665	5	2	33	3	50	1	17	6	5
Armação	5,880	6	1	25	3	75	0	0	4	4
Caieira da Barra do Sul	1,741	2	0	0	0	0	0	0	0	0
Campeche	9,739	10	2	13	9	60	4	27	15	14
Carianos	8,430	9	3	37	4	50	1	13	8	7
Costeira do Pirajubaé	10,629	11	1	8	5	42	6	50	12	11
Fazenda do Rio Tavares	9,599	10	3	13	13	54	8	33	24	22
Morro das Pedras	5,635	6	1	17	3	50	2	33	6	5
Pântano do Sul	3,595	4	0	0	1	100	0	0	1	1
Ribeirão da Ilha	2,678	3	1	33	2	67	0	0	3	3
Rio Tavares	7,697	8	3	16	11	58	5	26	19	17
Saco dos Limões	11,885	12	3	43	3	43	1	14	7	6
Tapera	12,962	14	2	33	2	33	2	33	6	5
TOTAL	95,135	1000	22	20	59	53	30	27	111	100

In the locations with the lowest population density such as Caieira da Barra do Sul, Ribeirão da Ilha and Pântano do Sul, with 2% (1,741), 3% (2,678) and 4% (3,595) of Florianópolis municipality inhabitants, respectively, they deploy, jointly, only 4% of the establishments. On the other hand, the locations with the highest population density including Costeira do Pirajubaé, Saco dos Limões and Tapera, with 11% (10,629), 12% (11,885), 14% (12,962) inhabitants, respectively, deploy 22% of the food outlets.

Considering the number of establishments in each territory, their unequal distribution between the locations is evident. In the districts further away from the central region of Florianópolis there is a lower concentration of establishments; examples are Pântano do Sul, that deploys only 1% of all establishments, Armação with 4%, Ribeirão da Ilha with 3%, and, even, a territory (Caieira da Barra do Sul), which does not have any establishment selling food. On the other hand, we found a greater concentration of food outlets located on the main districts access roads in the southern part of the municipality, locations which are characterized by a large flow of people.

We could observe the absence of establishments that primarily sell fresh foods in two locations (Caieira da Barra do Sul and Pântano do Sul). In one location (Costeira do Pirajubaé) a greater availability of UPF selling commercial establishments was found compared to mixed foods and fresh foods outlets (50%, 42% and 8%, respectively). In other locations, there was a greater availability of establishments that sell UPF compared to fresh food: Campeche (27%UPF and 13% fresh food), Fazenda do Rio Tavares (26% UPF establishments and 16% fresh food), Morros das Pedras (33% UPF establishments and 17% fresh food) and Rio Tavares (33%UPF and 13% fresh food establishments).

Table 2. Density of establishments selling predominantly fresh, mixed and ultra-processed foods per thousand inhabitants (users registered in health centers in the Southern Health District of Florianópolis, Santa Catarina, 2020).

Healthcare Center (HC)	Density of fresh food establishments/ 1000 inhabitants*	Density of mixed establishments/ 1000 inhabitants**	Density of fresh and mixed establishments/ 1000 inhabitants***	Density of ultra-processed establishments/ 1000 inhabitants****
Alto Ribeirão	0.43	0.64	1.07	0.21
Armação	0.17	0.51	0.68	0
Caieira da Barra do Sul	0	0	0	0
Campeche	0.20	0.92	1.13	0.14
Carianos	0.36	0.47	0.83	0.12
Costeira do Pirajubaé	0.09	0.47	0.56	0.56
Fazenda do Rio Tavares	0.31	1.35	1.67	0.83
Morro das Pedras	0.18	0.53	0.71	0.35
Pântano do Sul	0	0.28	0.28	0
Ribeirão da Ilha	0.37	0.75	1.12	0
Rio Tavares	0.39	1.43	1.82	0.65
Saco dos Limões	0.25	0.25	0.50	0.08
Tapera	0.15	0.15	0.31	0.15

* p25= 0.15 ; p50=0.20; p75=0.71 ** p25= 0.28; p50=0.51; p75=0.75 *** p25= 0.50; p50=0.71 ; p75=1.12 **** p25=0; p50=0.15 ; p75=0.41

Table 2 shows the density of food establishments per thousand inhabitants (users registered in health centers), calculated for each type of establishment (fresh food, mixed and UPF) as well as for the sum of fresh food and mixed establishments (criterion to describe a territory as a food desert). Considering the density of fresh food and mixed food establishments, the regions of Caieira do Saco dos Limões, Pântano do Sul, Saco dos Limões and Tapera, all with a density lower than 0.5 (corresponding to the 25th percentile) should be considered food deserts.

DISCUSSION

In our study, a higher proportion of establishments selling mixed foods was found, and a reduced rate of outlets selling fresh and minimally processed foods. Unfavorable characteristics regarding the evolution of the acquisition of food for home consumption can be observed in Brazil including a growth in the consumption of sugar, meat, milk and dairy products and fats in general. Therefore, the traditional Brazilian diet, based on the consumption of fresh and minimally processed foods, has lost space to a diet rich in UPF.^{37,38}

The presence of large concentrations of establishments that sell UPF can be a predictor of poor food quality, even greater than the reduced number of supermarkets and mixed food stores.³⁹ A study carried out in China⁴⁰ showed a certain similarity when evaluating the food environment; the authors observed that the majority of the 9,274 food establishments mapped were fast food restaurants or convenience stores, sites that sell mostly processed foods and UPF.⁴⁰

These results are opposite to those found in a comparative study carried out in the city of Florianópolis, that indicated a greater number of establishments classified as healthy food outlets (47%), followed by unhealthy (34%) and a smaller rate of establishments offering mixed foods (19 %).³⁰ It is noteworthy that in such study, although another nomenclature was used - healthy, unhealthy and mixed - the classification was similar in both studies; however other establishments were also mapped, such as butchers and fishmongers, which may partially explain the differences found in the proportion of the categories of establishments.

Similar to this study, Corrêa et al.³⁰ also found, in some areas of Florianópolis, a lack of establishments that offer fresh food, therefore making access to healthy foods difficult, and may be the cause of food deserts. The presence of food deserts can have a negative impact on the health of those areas' residents, associated with unhealthy eating habits and, consequently generating obesity problems.³⁹

A study carried out in Belo Horizonte, which aimed to characterize and compare neighborhoods on the basis of social inequality, and using the Brazilian methodology for identifying food deserts, found that there is a strong presence of food deserts in that municipality. However, the influence potential of food deserts on food consumption has changed due to the current social inequalities.³¹ Another study, also carried out in Belo Horizonte, identified that most sections of the city provide easy physical access to retailers that sell predominantly ultra-processed foods. The authors also report that the metric for identifying food deserts developed in Brazil was the most appropriate among those used, as it considered specificities of the local food environment.⁴¹

It is noteworthy that, in the field of health work, particularly in primary health care, the identification of the food environment in different realities is part of the territory diagnosis process. Therefore, the health team needs this information to develop comprehensive food and nutrition care practices in connection with the actual framework of the location and that contribute to comprehensive health care.⁴² An example of

essential information for the development and implementation of nutrition actions and nutrition in health territories, concerns the mapping activity and awareness of the places where people purchase food.

Usually, to access food, individuals dwelling in an area considered a food desert need to move to another territory, using some form of transport, which makes access to fresh and minimally processed foods troublesome.⁴³ This difficulty can occur because people with low purchasing power generally live in food desert regions and often cannot afford paying for public transport or are without access to another means of transport, such as a car, which demonstrates opportunities disparity.⁴⁴

In a study carried out with 138 individuals in a municipality in the northeastern region of Brazil, it was observed that 60.1% of individuals had the habit of buying food in the territory where they reside, but only 49% used to buy fruits and vegetables in that territory.⁴⁵ In the municipality of São Paulo, a study interviewing 48 adults between 20 and 59 years old, found that 70.8% of the respondents bought food in neighboring districts, due to the high cost or lack of quality of food establishments.⁴⁶ Therefore, it should be highlighted that the availability of establishments that allow the acquisition of healthy food by residents in their own territory can reduce the time that would be spent traveling to another territory to purchase food, thus facilitating access to better quality food from a nutritional point of view and favoring those who have few financial resources.⁴⁷

In turn, food environments with less availability and accessibility to healthy foods can greatly stimulate the consumption of UPF, as these establishments have a powerful advertising appeal and often seek to stimulate consumption in exacerbated quantities.⁴⁸ In this connection, a study carried out by Silva and collaborators (2019) in the city of Viçosa - Minas Gerais, with a sample of 965 adults aged 20 to 59 years, in order to estimate associations between environmental variables and obesity in the adult population, identified the unavailability of establishments selling fresh food and minimally processed food in the municipalities peripheral areas.⁴⁹ These sites have a high concentration of UPF and can be considered obesogenic food environments, as they generally offer foods with low nutritional value, high caloric density and often at low cost.^{39,50}

The results found show that in the Southern Health District, food environments do not offer fair opportunities for access to healthy foods and there is no equity in the distribution of food sales establishments. Unequal access to healthy and affordable foods reinforces health disparities.^{51,52} Access to food occurs due to its availability, physical accessibility, affordability, acceptability and convenience. Physical accessibility refers to the distance to establishments, barriers and physical facilities for access.⁵³ Physical and economic access is when everyone has the ability to acquire food in a socially acceptable way, thus ensuring food and nutritional security, having availability and access to sufficient and quality food.⁵⁴

However, we must consider that the mere existence of establishments that offer healthy food close to the residence does not assure its consumption, that is, it is just one dimension of access.^{55,56} When analyzing the acquisition of food, Costa et al.⁵⁷ in their study, found that families with income below one minimum wage had a higher prevalence of low consumption of healthy items, such as fruits and vegetables. And in a study carried out in Belo Horizonte - Minas Gerais, there was greater consumption of fruits and vegetables by individuals who were food secure, according to the *Escala Brasileira de Insegurança Alimentar* (EBIA, Brazilian Food Insecurity Scale).⁴⁸ It should be noted, therefore, that although healthy food availability is important, it is necessary to ensure healthy food equitable distribution, as food environments affect social groups in different ways, and prices can represent a barrier for low-income families.⁵⁸

This work has some limitations, such as possible underestimation in relation to the list made available by the health surveillance service, which could contain outdated or incomplete data due to the lack of

registration of informal food establishments in the databases. Similarly, Costa, et al.,⁵⁷ in their search in secondary databases in the city of Belo Horizonte, found that a considerable number of establishments did not exist and, that a significant number of establishments were not registered in the databases. Furthermore, in our study, street vendors were not included due to the non-availability of updated registration with government agencies and commercial databases. Nor were all the types of establishments that sell food included such as ice cream parlors, pizzerias, butchers, fishmongers, among others. Another limiting point is the lack of updated Google Street View® data for many city districts, which can constitute a problem when it is desirable to use images as a source of information.⁵⁹ On the other hand, as strength of this study we include the use of a data collection methodology that focuses on the triangulation of information, aiming to qualify the information collected

CONCLUSIONS

The food environment of the Southern Health District has areas with a low concentration of establishments that sell food that are further away from the central region of Florianópolis. In some areas there is a lack of establishments selling fresh foods and, in others, a greater number of UPF outlets, thus making it difficult for the population to access foods considered healthier. A geographic region that offers easy access to healthy food establishments can favor more adequate nutrition, providing a food environment conducive to food and nutritional security, given that “food deserts” negatively impact people's health. Thus, the importance of an easier access to healthy foods to ensure the human right to adequate and healthy food is highlighted. In addition, the relevance of knowing the food environment to enable better targeting of public health strategies, including public policies and incentives aimed at increasing the availability of fresh food, and reducing the supply of UPF, is enhanced. Furthermore, it is necessary to provide a different perspective on the work of health professionals, who should be able to consider the characteristics of the food environment when counseling and monitoring individuals and families residing in these locations.

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Contributors

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