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Hygienic-sanitary conditions in popular restaurants in Brazil

Condições higienicossanitárias em restaurantes populares de cidades brasileiras

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ABSTRACT

Introduction: Popular restaurants aim to guarantee food and nutrition security for socially vulnerable populations, providing nutritionally balanced meals and in adequate hygienic- sanitary conditions. Therefore, it is necessary to implement sanitary control measures. **Objective:** To evaluate the hygienic-sanitary conditions of popular restaurants in Brazilian cities. **Method:** Cross-sectional, descriptive study, carried out in 11 popular restaurants, in the cities of Belém (PA), São Luís and Paço do Lumiar (MA), São Paulo (SP), Niterói (RJ) and Brasília (DF). For the evaluation of hygienic-sanitary conditions, the Checklist of Good Practices for Food Services was applied, based on RDCs nº 216/2004 and nº 275/2002, of the National Health Surveillance Agency, containing 156 items categorized into 12 groups of evaluation. The adequacy percentage of the establishments was calculated, being classified as: "adequate", "partially adequate" and "inadequate". **Results:** The hygienic- sanitary conditions of popular restaurants presented an overall adequacy average of 85.4%, obtaining an "adequate" classification. The only group that presented the lowest adequacy average classified as "partially adequate" (73.7%) was "buildings, installations, equipment, furniture and fixtures". The other groups on the checklist were classified as "adequate". **Conclusions:** Popular restaurants presented, in the global average of adequacy, adequate hygienic-sanitary conditions to produce meals. However, it is necessary to correct the inadequacies found in the group whose average was "partially adequate", in order to avoid health risks and guarantee the distribution of safe meals to consumers. It is up to the Municipal Sanitary Surveillance to inspect and monitor compliance with the sanitary norms in force by these establishments.

KEYWORDS: Good Handling Practices; Food and Water Borne Illness; Restaurants; Food Security; Health Surveillance

RESUMO

Introdução: Os restaurantes populares visam garantir a segurança alimentar e nutricional em populações socialmente vulneráveis, fornecendo refeições nutricionalmente balanceadas e em condições higienicossanitárias adequadas. Para tanto, é necessário implantar e implementar medidas de controle sanitário e de higiene. **Objetivo:** Avaliar as condições higienicossanitárias de restaurantes populares de cidades brasileiras. **Método:** Estudo transversal, descritivo, realizado de novembro a dezembro de 2020, em 11 restaurantes populares, nos municípios de Belém (PA), São Luís e Paço do Lumiar (MA), São Paulo (SP), Niterói (RJ) e Brasília (DF). Na avaliação das condições higienicossanitárias, aplicou-se a Lista de Verificação das Boas Práticas para Serviços de Alimentação, com base na RDC n° 216, de 15 de dezembro de 2004, da Agência Nacional de Vigilância Sanitária, contendo 156 itens categorizados em 12 grupos. Calculou-se o percentual de adequação dos estabelecimentos, sendo classificado em: "adequado", "parcialmente adequado" e "inadequado". **Resultados:** As condições higienicossanitárias dos restaurantes populares apresentaram média geral de adequação de 85,4%, obtendo classificação "adequado". O único grupo que apresentou menor média de adequação classificada como

"parcialmente adequado" (73,7%) foi "edificações, instalações, equipamentos, móveis e utensílios". Os demais grupos foram classificados como "adequados". **Conclusões:** Os restaurantes populares apresentaram, na média global de adequação, condições higienicossanitárias adequadas para a produção de refeições. Todavia, é necessário corrigir as inadequações encontradas no grupo cuja média foi "parcialmente adequada", de modo a evitar o risco sanitário e garantir a distribuição de refeições seguras aos consumidores. Cabe à Vigilância Sanitária municipal inspecionar e monitorar o cumprimento das normas sanitárias vigentes por esses estabelecimentos.

PALAVRAS-CHAVE: Boas Práticas de Manipulação; Doenças de Transmissão Hídrica e Alimentar; Restaurantes; Segurança Alimentar; Vigilância Sanitária

INTRODUCTION

Popular restaurants (PR), set up in the 1940s[1], are the oldest public facilities related to food, nutrition, and the fight against hunger and poverty in Brazil[2]. The Popular Restaurant Program was created in 2003[3] and became part of the National Food and Nutrition Security Policy in 2006, making up a set of public facilities that aim to guarantee food and nutrition security (SAN) for the socioeconomically vulnerable population.[1]

The Program is managed by the state or municipal government, through intersectoral actions developed in partnership with the Department of Agriculture, Livestock and Food Supply, Health Surveillance, the Department of Social Assistance, Organized Civil Society, among others; with the aim of serving nutritionally balanced meals, prepared with regional products, in adequate hygienic and sanitary conditions and at affordable prices, primarily to the population living in a situation of food and nutritional insecurity (FNI)[3] .

Brazil left the hunger map in 2014[4] but since 2016 FNI has worsened, reaching 36.7% of Brazilian households as a result of the economic and political crisis in the country[5]. With the occurrence of the COVID-19 pandemic in Brazil, the FNI reached 55.2% in 2020 and increased to 58.7% in 2022, reflecting the health crisis that has deepened the social and economic inequalities of the population and the fragility of public social protection policies for socioeconomically vulnerable groups[6]. Therefore, PR are also essential in the post-pandemic period, by making it possible to alleviate the hunger of 33.1 million people who have nothing to eat[6].

In order to guarantee the safety of hygiene and health aspects at all stages of the meal production process, good practices for food services (GPFS) must be implemented. To this end, these establishments must comply with the rules of Collegiate Board Resolution (RDC) No. 216, of December 15, 2004[7], which are recommended by the Brazilian National Health Surveillance Agency (Anvisa).

Anvisa coordinates Brazilian Health Regulatory System (SNVS), which is a subsystem of the Unified Health System (SUS) and includes health surveillance units at federal, state, and municipal level, with shared responsibilities. It is up to the SNVS to carry out inspection actions, which it implements and monitors; and the sanitary control of food services (FS), mainly by the Municipal Sanitary Surveillance (VSM)[8].

It should be noted that the absence of GPFS can trigger food- and waterborne and diseases (FWBD) in people who eat in FS, due to the consumption of food contaminated by etiological agents and inadequate hygienic and sanitary conditions in the environment and among food handlers[9]. FWBDs are a public health problem worldwide due to their high morbidity and mortality rates[10] and the high economic costs to health services of treating them[11].

A study carried out in ten PR in the state of Rio de Janeiro in 2009, in which hygienic and sanitary conditions were assessed, found that five PR were classified as "regular" and four as "deficient". It was concluded that the low level of inadequacy may be associated with low investment in the implementation of GPFS and a lack of awareness of the importance of adapting these establishments in the context of safe food[12].

In view of the above, it is necessary to continuously inspect and monitor the hygienic and sanitary conditions of PR in order to prevent and control FWBDs. In addition, a large proportion of the Brazilian population lives with FNI and these establishments contribute to improving this situation by providing safe, nutritious meals at low prices. For these reasons and in view of the scarcity of research in the national literature that addresses this issue in PR, the aim of this study was to evaluate the hygiene and sanitation conditions of PR installed in Brazilian cities.

METHOD

This is a cross-sectional, descriptive study, nested within a larger project entitled "Proposal for a Researcher's Manual for the Popular Restaurants Program", carried out in November and December 2020, on the premises of each PR.

The non-probabilistic sample consisted of 12 PRs located in Belém (PA) (n = 1), São Luís and Paço do Lumiar (MA) (n = 8), São Paulo (SP) (n = 1), Niterói (RJ) (n = 1), and Brasília (DF) (n = 1). During the course of the study, one PR (8.3%) lost its data due to not answering some of the items on the list. Therefore, 11 PRs were evaluated.

In order to assess the hygiene and sanitary conditions of the restaurants, we used the checklist of good practices for food services, drawn up on the basis of Anvisa's RDC 216/2004. This Resolution presents the Technical Regulation of Good Practices for Food Services[7], to which all these establishments must comply.

Furthermore, this standard is used in the inspection and monitoring of the sanitary control of FS by the VSM, with the aim of controlling the risks of developing FWBD and protecting the health of the population[13].

In classifying the adequacy of the hygiene and health aspects of the PR, we adopted the criteria recommended by Anvisa's RDC No. 275, of October 21, 2002[14], since RDC No. 216/2004[7] does not present these criteria. RDC 275/2002 sets out the technical regulations for standard operating procedures applied to food producing/industrializing establishments and the checklist for good manufacturing practices in food producing/industrializing establishments[14].

When evaluating the PRs, the items on the GPFS checklist that complied with the recommendations of RDC no. 216/2004[7] were marked "YES", those that did not comply with the recommendations were marked "NO", and those that were not applicable to the reality of the establishments were marked as not applicable "NA".

For each item on the GPFS checklist marked "YES", one point was awarded, and answers marked "NO" received a score of zero. The number of answers marked "NO" and the items with no information (NI) were subtracted from the total number of items on the list and were not included in the final sum. Next, the total score of "YES" answers (adequate items) was divided by the total number of items assessed and multiplied by 100, in order to obtain the percentage of adequacy of hygiene and health conditions in each PR14. The average percentage of adequacy was also obtained for all the PRs assessed. The average adequacy of each PR was calculated by applying the following equation:

$$\% \text{ Adequacy} = \frac{\text{suitable items ("YES")}}{\text{items evaluated (156) - ("NA" + "NI" items)}} \times 100$$

These percentages were compared to the cut-off points defined by RDC no. 275/2002 and classified as: "adequate" when the PR achieved percentages greater than or equal to 76% compliance with the items; "partially adequate", between 51% and 75%; and "inadequate", when less than or equal to 50%[14].

The checklist used included 156 items categorized into 12 assessment groups[7], as described in the chart.

During the visits to the PRs, trained interviewers filled in the GPFS checklist, using direct observations on site and information obtained from the records provided by the technical managers, such as: integrated pest control, water potability analysis, GPFS manual, standard operating procedures and equipment time and temperature control.

The data was tabulated in duplicate and analyzed using Microsoft Excel®. The results were presented using means, absolute and relative frequencies.

The matrix study was approved by the Ethics Committee for Research with Human Beings of the Federal University of Maranhão, under Opinion No. 4.043.090/2020 and in accordance with Resolution No. 466 of December 12, 2012, and its complements of the National Health Council. The respondents to some of the items on the GPFS checklist agreed and signed the Informed Consent Form (ICF).

RESULTS

All 11 PRs evaluated in this study had outsourced food and nutrition unit (FNU) management, by hiring a food service company. Of the PRs evaluated, 90.0% operated on working days and 72.7% of them served lunch and dinner. Lunch was the meal distributed most frequently in the PRs, ranging from 600 to 900 diners a day in 54.5% of the establishments, and from 1,700 to 1,900 diners in 27.3% of them.

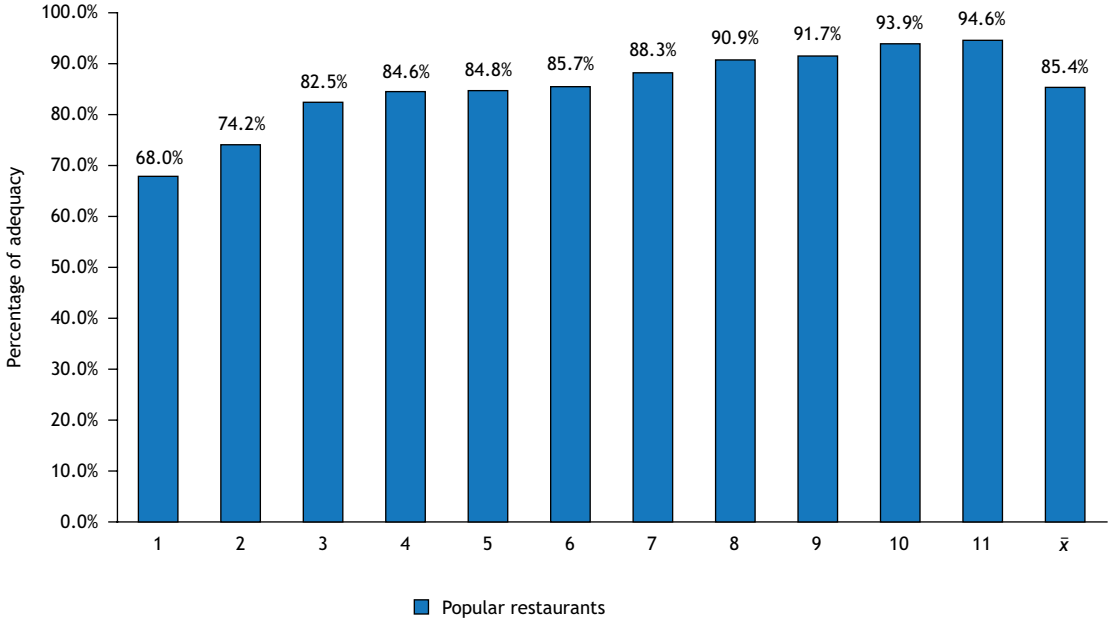
The percentages of adequacy of the hygiene and health aspects of the PRs evaluated ranged from 68.0% (partially adequate) to 94.6% (adequate). The overall average adequacy of the PRs was 85.4%, which was classified as adequate (Figure).

Of the 11 PRs in this study, 81.8% were classified as adequate (76.0% to 100.0%) and no facility was classified as inadequate (data not shown in table).

The analysis of the average individual adequacy and the average of the set of PRs, according to the groups that make up the GPFS checklist, is shown in the Table. It was found that, of the total of 12 groups assessed in the list, 11 of them had their averages classified as adequate. The "Buildings, facilities, equipment, furniture, and utensils" group was the only one with the lowest average score (73.7%) and was classified as partially adequate. The "Responsibility" group was 100.0% adequate.

Chart. Description of the evaluation groups and quantities of items on the checklist of good practices for food services that were evaluated in popular restaurants in Brazilian cities.

Evaluation group	Number of items
1 - Buildings, facilities, equipment, furniture, and utensils	34
2 - Hygienization of facilities, equipment, furniture, and utensils	14
3 - Integrated pest control	5
4 - Water supply	9
5 - Waste management	3
6 - Handlers	14
7 - Raw materials, ingredients, and packaging	15
8 - Food preparation	31
9 - Storage and transportation of prepared food	5
10 - Exposure to consumption of pre-prepared food	9
11 - Documentation and recording	15
12 - Responsibility	2
Total	156



Source: Prepared by the authors, 2022.

Figure. Percentage of hygienic and sanitary conditions in popular restaurants in Brazilian cities

It was also noted that PR 1 showed an insufficient average (50.0%) in the "Buildings, installations, equipment, furniture, and utensils" group, and was considered inadequate. Also in this same group, PRs 2, 3, and 4 were classified as partially adequate. In the "Hygienization of facilities, equipment, furniture, and utensils" group, PRs 6 and 8 had the lowest average levels of adequacy, classifying them as partially adequate (Table).

RP 3 was the only one with a lower average level of adequacy (60.0%) in the "Integrated pest control" group and was classified as partially adequate. In "Water supply", PR 6 had a poorer average level of adequacy (25.0%) than the other establishments and was classified as inadequate, while RP 4 was classified as partially adequate (75.0%). PRs 5 and 11 had equal averages (66.7%) in the "Waste management" group and were the only ones classified as partially adequate. When evaluating the "Handlers" aspects, PRs 4 (69.2%) and 5 (71.4%) had the lowest average levels of adequacy and in the "Raw materials, ingredients. and packaging" group, PR 5 was classified as partially adequate (Table).

The "Food preparation" aspect was analyzed in the PRs that produced meals in the establishment itself. Five PRs (3, 4, 6, 7, and 8) were disregarded in this analysis because they received meals transported from the facilities of the FS provider and distributed to diners. In this respect, the PRs were classified as adequate (Table).

PR 6 had the lowest average level of adequacy (75.0%) in the "Storage and transportation of prepared food" group. In "Exposure to consumption of pre-prepared food", PR 9 was the only one classified as partially adequate. Regarding "Documentation and recording", PRs 3 (66.7%) and 11 (71.4%) had the lowest averages and were classified as partially adequate. In the last aspect assessed, "Responsibility", NA was given to five PRs (1, 2, 3, 7 and 11) and the others had averages of 100.0%, above the 76.0% considered adequate by the standard. It was also noted that PR 7 and 10 were the only ones to achieve percentages above 75.0% (adequate) in all the groups analyzed in the list of GPFS (Table).

DISCUSSION

The results of this study show that in the 11 PRs evaluated, the overall average level of compliance with hygiene and health aspects was high, with all establishments classified as adequate and none as inadequate. Of the 12 groups on the GPFS checklist assessed, 11 of them had averages classified as adequate. The "Buildings, facilities, equipment, furniture, and utensils" group was the only one with a lower average level of adequacy and there was no inadequacy in the "Responsibility" group.

The overall average compliance with hygiene and health aspects of the PR evaluated in this study was higher than the overall average of 69.0% observed in an investigation carried out in ten PR in Rio Grande do Norte[15]. Therefore, the PRs in this study complied with the Guidance for Preparing Standard Operating Procedures (SOPs) and the GPFSs recommended by Anvisa[7,14].

The analysis of the "Buildings, facilities, equipment, furniture, and utensils" group of the GPFS Checklist pointed out non-conformities such as: compromised structure of the window screens located in the food storage and preparation areas, direct impact of the air flow on the preparations, and communication between the sanitary facilities and the food handling area. Corroborating the results of this investigation, in two

Table. Individual average and overall average of adequacy by group of the checklist of hygiene and health aspects of popular restaurants in Brazilian cities.

Group	Popular restaurant/% adequacy											
	1	2	3	4	5	6	7	8	9	10	11	Average
Buildings, facilities, equipment, furniture, and utensils	50.0	60.0	65.6	71.9	80.6	85.2	76.7	75.9	75.9	81.5	87.1	73.7
Hygienization of facilities, equipment, furniture, and utensils	78.6	78.6	100.0	92.3	85.7	70.0	92.3	75.0	92.9	100.0	100.0	87.8
Integrated pest control	100.0	100.0	60.0	100.0	80.0	80.0	100.0	100.0	100.0	100.0	100.0	92.7
Water supply	100.0	83.3	85.7	75.0	100.0	25.0	100.0	100.0	100.0	100.0	100.0	88.1
Waste management	100.0	100.0	100.0	100.0	66.7	100.0	100.0	100.0	100.0	100.0	66.7	93.9
Handlers	92.9	92.9	100.0	69.2	71.4	92.9	85.7	100,0	92.9	100.0	100.0	90.7
Raw materials, ingredients, and packaging	93.3	93.3	84.6	100.0	71.4	85.7	100.0	NA*	100.0	100.0	80.0	89.8
Food preparation	100.0	96.0	NA*	NA*	96.7	NA*	NA*	NA*	96.1	94.1	100,0	97.1
Storage and transportation of prepared food	100.0	NA*	80.0	100.0	100.0	75.0	100.0	100.0	NA*	100.0	100.0	95.0
Exposure to consumption of pre-prepared food	100.0	88.9	100.0	100.0	77.8	100.0	87.5	100.0	75.0	100.0	87.5	92.4
Documentation and recording	NA*	78.6	66.7	78.6	86.7	93.3	100.0	100.0	86.7	92.9	71.4	77.7
Responsibility	NA*	NA*	NA*	100.0	100.0	100.0	NA*	100.0	100.0	100.0	NA*	100.0

separate studies carried out in ten PR in the state of Rio de Janeiro, when applying the same Checklist, inadequacies were found in the physical facilities of the PR and in the orderly flow of materials, people, and preparations[12,16].

It is possible that the non-conformities listed in this study derive from the fact that PRs are adapted from other locations and that technical building and ergonomic standards were disregarded when their renovation or construction projects were drawn up. These inadequacies are worrying and need to be reversed in order to improve the operation of the service and avoid cross-contamination at all stages of the meal production process. In this sense, the VSM is responsible for inspecting and monitoring these establishments, implementing educational actions, determining corrective measures, carrying out interventions, and applying the relevant sanctions when there is non-compliance with the GPFS standards[17,18].

As for the group "Hygienization of facilities, equipment, furniture, and utensils", in two of the PRs investigated there were inadequacies in the disposal of waste and the frequency of cleaning grease traps, as well as the absence of appropriate and differentiated uniforms for employees who cleaned sanitary facilities. These results were similar to those found in the investigation of PRs in the state of Rio Grande do Norte, where the average obtained for this same group was 80.0%, and inadequacies were also found in the disposal of waste and the cleaning of grease traps[15].

These non-conformities point to the need for VSM to continuously inspect and monitor the service routine in the PR to ensure compliance with the hygiene and sanitization standards in force in the country and thus guarantee the consumption of safe meals in these places. It should be noted that RDC No. 216/2004[7] does not deal with how waste should be disposed of in FSs, as it is out of date in relation to the National Solid Waste Policy (PNRS), instituted in Brazil by Law no. 12.305, of August 2, 2010[19], and discussions in the environmental field.

In addition, PR managers should be made aware and instructed, by their technical managers and the VSM teams, about the obligation to provide uniforms to their employees, in adequate quantities and that are appropriate to the nature of the service, as these garments can carry pathogenic agents from one environment to another and contaminate food[20] .

The overall average suitability of the PRs for the "Integrated pest control" group was satisfactory and corroborates the results of the study conducted in two FNUs in two municipalities in Rio Grande do Sul, where 100.0% and 85.7% suitability was observed, respectively, for this group[21]. It should be emphasized that continuous preventive and corrective actions must be taken to prevent the attraction, harboring, access and/or reproduction of vectors and urban pests in the FS that compromise food safety[7] and cause health problems.

Preventive measures include the use of physical barriers in the FS, such as: millimeter screens on windows and openings, drains with covers and closing systems, door sill seals, and air curtains[22]. If these preventive measures are ineffective, chemical control should be employed and carried out by a specialized company, using disinfectant products that have been approved

by the Ministry of Health[7]. However, outsourced disinsection companies do not always ensure a sustainable practice, as they use inappropriate chemical products that cause damage to the environment and to people's health.[22]

In addition, the VSM must inspect, develop educational actions, and monitor whether these establishments are complying with the provisions of RDC No. 216/2004[7] and the recently created Anvisa RDC No. 622, of March 22, 2022, which establishes good operating practices for companies providing vector and urban pest control services, especially regarding chemical control, in order to minimize their environmental impact and the health of people[23].

The evaluation of the "Water supply" group showed that all the PR had a drinking water system for food handling and one of them was rated inadequate, due to the fact that the water tank was damaged and there was no record of the water potability assessment. This result agrees with the findings of Viana et al.[24], who found 86.7% compliance in this same group of 740 FSs evaluated in Brazil. It is worth noting that the inadequacy found in this study needs to be reversed, as the water tank must be maintained and fitted with a lid and the quality of the water used to produce meals must be assessed every six months, with a laboratory report being issued[7]. In the absence of these controls, the biological and chemical agents present in the water supply could contaminate the food, implying a risk of damage to the health of the diners.[25]

The analysis of the "Waste management" group showed that the PRs presented an adequate overall average. However, in two restaurants the number of waste disposal containers was insufficient. Similarly to this result, Silva et al.[26], when evaluating a FNU in Taquari (RS), found an average of 100.0% adequacy in this group. Considering that RDC No. 216/2004 stipulates that FSs maintain waste containers in sufficient number and capacity to store waste[7], the insufficiency of these containers in PRs could mean that waste has to be collected more frequently and could jeopardize the orderly flow of operations, as well as generating cross-contamination.

It should be pointed out that RDC no. 216/2004[7], which predates the PNRS[19] , does not establish rules on the disposal of waste in FS. Therefore, it is necessary to update this RDC, given that the PNRS presents guidelines for sustainable solid waste management and the existing advances in the environmental area regarding selective collection, segregation and recycling of solid waste, reuse and composting of organic waste, sustainable disposal, reverse logistics, and the social inclusion of waste pickers[19].

The generation of solid waste without proper disposal causes environmental contamination and increases the greenhouse effect, contributing to the growth of climate change and, consequently, water scarcity, intense droughts, diminishing natural resources and catastrophic storms. These environmental changes damage agricultural production and food availability, thus compromising the food system by causing food prices to rise and impacting on the increase in business environment indicators in developing countries[27].

In this sense, PR managers can contribute to reducing environmental impacts by reducing the generation of solid and liquid waste (cooking oil) in these establishments and ensuring that it is disposed of in an environmentally appropriate manner. To this end, actions should be taken against food waste during the meal production process, employee training to make full use of food and environmentally sustainable waste management[28]. VSM is also responsible for developing educational actions, inspecting and monitoring waste management in the FS, in accordance with the PNRS in force in the country.[19]

The overall average of PR adequacy was high for the "Handlers" group. However, two establishments identified incorrect hand washing and conversation between employees during work as inadequacies, as well as a shortage of posters with guidance on correct hand washing and other hygiene habits. In Oliveira's investigation[12], the average level of adequacy for the "Handlers" group was lower (57.0%) than that found in this study.

Food handling areas are the most susceptible to cross-contamination and one of the determining factors is the inadequate habits of food handlers[29]. In view of this, RDC no. 216/2004 stipulates that food handlers must be periodically supervised and trained in the topics of personal hygiene, hygienic food handling and FWBD, and the FS must record and keep documentation of these events[7]. It should be emphasized that continuous inspection and monitoring by the VSM, to ensure compliance with these requirements, can help reduce the risk of food contamination in PR and, consequently, the occurrence of FWBD.

When evaluating the "Raw materials, ingredients, and packaging" group, the overall average adequacy was satisfactory but in one of the PRs there were inadequacies during the transportation of inputs, poor inspection during the reception of goods and incorrect storage. Rebouças et al.[30] evaluated seven FNU in municipalities in Piauí and in six of them the average levels of adequacy for this group were similar to those presented in this study. It is worth pointing out that the non-conformities in this group need to be eliminated, as they compromise the guarantee of the quality of the final PR product, since any alteration to the food during its transportation, receipt and storage can lead to its contamination[7], putting the health of diners at risk, and the waste of inputs.

For the "Food preparation" group, the overall average of adequacy was one of the highest and the irregularities present were the control of time and temperature during the exposure of preparations to consumption and defrosting of food, as well as the lack of identification of preparations during storage. In contrast to the results of this study, Ferreira et al.[31] and Lima[15] found lower overall averages of adequacy for this group, representing 59.4% and 70.0%, respectively.

Lira et al.[32] stated that controlling the binomial of time and temperature is essential, since inadequate temperatures and long

exposure times contribute to the multiplication of microorganisms in food. It is also recommended that food should be thawed under refrigeration and every preparation should be identified by its characterization, date of preparation and expiry date[7]. That said, controls and records involving the preparations produced should be carried out routinely. In addition, employees should be trained in the GPFS[7], because once these practices are incorporated into the service routine, they will help to guarantee the safety of the meals served.

Regarding the "Storage and transportation of prepared food" group, the overall average level of adequacy was high, but the following irregularities were identified: lack of protection against contaminants for food prepared and kept in the storage area or awaiting transportation and lack of identification of the preparation, which should include at least its name, date of preparation and expiration date. In contrast to this finding, other authors, when evaluating this same group in two FNUs in Vale do Taquari (RS), found that one of them failed to control the temperature of the preparations during transportation[21]. The need to apply corrective measures to the non-conformities found in the PRs regarding hygiene and health standards should be emphasized. To this end, educational actions aimed at employees and continuous monitoring of operations related to the storage and transportation of prepared food should be implemented, in order to check that GPFSs are being incorporated and that consumers' health is not put at risk.

Regarding the group "Exposure to consumption of pre-prepared food", although all the PRs showed an overall average of favorable adequacy, inadequacies were observed in three establishments, such as the absence of physical barriers to protect against contamination in the equipment used to display preparations to diners. A study carried out in three FNUs at a university center in Ceará showed nonconformities different from those recorded in this investigation, such as the absence of food display equipment and employees receiving payments while handling prepared food[33]. Therefore, it is essential to reverse these inadequacies during the display of preparations in the PR distribution area, in order to prevent contamination and guarantee the safety of the meals consumed.

The overall average adequacy of the "Documentation and recording" group was satisfactory. However, inadequacies were identified in two PRs, such as: the Good Practices Manual and the SOP not being accessible to employees and unavailable to the health authority; the SOPs not being kept on record for at least 30 days; and the SOP for hygienization of facilities, equipment, and furniture not containing the necessary information. Contrary to this result, Oliveira[12] found that 24.0% of this group was adequate, due to flaws in the execution of the SOPs and the inadequacy of the Good Practices Manual to the reality of the establishments.

In view of this, the FS must have the Good Practices Manual and the SOPs[7], since these instruments establish the standardization of processes in order to guarantee the safety of the meals produced and are relevant in guiding the employees of the FS and should be accessible to them[23]. It is the VSM's responsibility to demand that these documents are presented when inspecting and monitoring the FS, and that they are updated whenever necessary.

The PRs had nutritionists as their technical managers and, as part of their duties, they periodically trained their employees on the topics of hygienic food handling and GPFS. In view of this, there was no inadequacy in the "Responsibility" group, which is a favorable aspect of this research in PRs, as it contributes to the safe execution of operations in the service routine. In contrast to this result, in a qualitative integrative review study carried out by Ferreira et al.[31] in FS in Brazil, the authors found 47.0% adequacy for this group.

This study had some limitations, namely: the sample was not probabilistic, making it impossible to infer the results for all PRs in Brazil; the inability of the inspectors to observe the state of conservation of the water tank and the filters of the air conditioning equipment, due to their being located at an inaccessible height in the building; and the evaluation of the "Food preparation" group carried out in five PRs, out of the 11 investigated, due to the fact that these establishments receive meals that are transported and prepared on the premises of the health service provider. Another limitation was the fact that RDC No. 216/2004 was out of date in relation to the country's PNRS, which made it impossible to identify, using the GPFS checklist, whether the waste management in the PR was carried out in an environmentally sustainable manner.

Positive aspects include the fact that, despite the scarcity of articles in the literature evaluating hygiene and health aspects in PR, this study has made it possible to broaden the discussion on this subject, which has so far been little explored.

CONCLUSIONS

In this study, the overall average for the adequacy of hygiene and sanitation conditions in the 11 PRs was 85.4%, classifying the establishments as adequate. However, there are aspects that need to be corrected in order to ensure that meals are safe for the end consumer, such as the "Buildings, facilities, equipment, furniture, and utensils" group, which had the lowest average level of adequacy (73.7%) and was classified as partially adequate.

The non-conformities observed in the PRs could possibly be corrected by improving their physical facilities and training their employees, so as to continuously implement the GPFS. In addition, inspections, educational activities, and continuous monitoring of the hygiene and health conditions of these establishments by VSM will contribute to controlling and reducing the health risk throughout the entire meal production process.

However, it is necessary to update RDC No. 216/2004 in the approach to solid waste management by the FS in a sustainable manner, with a view to preserving the environment, reducing climate change, and improving food systems.

In the current scenario, in which a significant number of Brazilians are food insecure, PRs are essential to alleviate the hunger of these people by providing healthy meals at affordable prices. However, in addition to the nutritional aspect, the meals must be safe from a hygienic and sanitary point of view, as contamination can cause damage to health through the occurrence of FWBD.

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Authors' Contribution

Calado IL, Padilha LL, Frota MTBA, Viola PCAF, Conceição SIO - Conception, planning (study design), acquisition, analysis, data interpretation, and writing of the work. Ribeiro MS - Acquisition, analysis, data interpretation, and writing of the work. All the authors approved the final version of the work.

Conflict of Interest

The authors inform that there is no potential conflict of interest with peers and institutions, political or financial, in this study.