

Worker Food Program: Do Buffet Restaurants Allow Healthy Eating?

Elizabeth Gonçalves Lima¹, Haydée Serrão Lanzillotti²,
Roseana Moreira Sampaio Barbosa³, Maria Elisa Barros⁴

¹Pedro Ernesto University Hospital, State University of Rio de Janeiro, Rio de Janeiro, CEP: 20.551-030, Brazil

²Department of Social Nutrition, Institute of Nutrition. State University of Rio de Janeiro, CEP: 20550-900, Rio de Janeiro, Brazil

³Department of Social Nutrition, Faculty of Nutrition Emília de Jesus Ferreiro. Fluminense Federal University, CEP: 24020-140, Niteroi, Brazil

⁴Department of Social Nutrition, Institute of Nutrition. State University of Rio de Janeiro, CEP: 20550-900, Rio de Janeiro, Brazil

Abstract: *Objective:* the aim of the study was to propose a measurement instrument to assess healthy food choices in buffets in self-service restaurants. *Method:* Cross-sectional study with restaurants whose are agreements with the with the Worker's Food Program (WFP)-Brazil, carried out from Dec/2018 to Jan/2019. *Step 1:* elaboration and "face validity" of the "Checklist, Friedman test (F), Reliability by Generalization Theory, G coefficient (CG). *Step 2:* application of the checklist (n= 30 restaurant buffets, sample evaluated by post hoc). Kruskal-Wallis (KW) test and Dunn's multiple comparisons test. *Results:* *Step 1:* The Friedman test showed that there was no significant difference in the judges assessment ($P_{value}=0.1149$, $F=12.91$). CG of 0.9822, 0.9500 and 0.9468 for interactions: among judges, among restaurant buffets and among food group items evaluated by judges for restaurant buffets. The goodness of fit given by Root Mean Square Error (RMSE) =0.0000 indicated plausibility of the model and the coefficient of determination ($R^2=1.00$), that the model adequately fitted the data. *Step 2:* After the validation of the checklist, it was applied in restaurants (n=30) and Post hoc test showed power below 0.80 by indicating the absence of external validity. The findings showed that the buffets of self-service restaurants presented both healthy and unhealthy foods in their buffets. *Conclusion:* The study showed evidence of "face validity" and reliability of the checklist to assess whether foods, food preparations and beverages offered at buffet restaurants self-serve agreement with WFP approximate possible healthy food choices.

Keywords: Workers, Public Policies, Food, Checklist, Validity, Reliability

1. Introduction

In Brazil since the 1970s, the Worker's Food Program (WFP) was established by Law n.6.321 of April 14, 1976 [1] and is currently regulated by Decree n.10.854, of November 10, 2021 [2] and additional instructions established by Governmental Order n.672, of November 8, 2021 [3].

The Program has voluntary adhesion by private companies and the priority is for low-income workers, in order to improve the nutritional status of this segment, aiming to ensure healthy food. The offer of healthy meals in the work environment should be one of the objectives of companies that seek to promote employee health, reduce absenteeism and improve productivity [4]. Thus, the regulation of the WFP, Decree n.10.854 [2] establishes that the business must have registered a professional in the area of Nutrition, with university education, as technical responsible.

Despite of the Governmental Order n.66, of August 25 [5], which establishes dietary allowance, several studies point to nutritional inadequacies in the meals offered to WFP beneficiaries. A study on the quality of the meals served found that medium and large companies in the industrial sector obtained an adequate Meal Quality Index (IQR). Unlike micro and small companies in the commercial sector showed that the quality of meals must be nutritionally improved [6]. Other studies that analysed menus, in the quantitative aspect, identified nutritional inadequacy with

values above those recommended for energy, carbohydrates, proteins, total and saturated fats, cholesterol, iron, sodium and low values of the dietary fibre [7, 8, 9, 10].

It is worth noting the importance of the dietary guidelines of the WFP in view of the current profile of the nutritional status of workers [11 (12, 13, 14, 15), which reflects the epidemiological scenario of the Brazilian population with the increase in weight and obesity.

When postulating the development of comprehensive care for workers' health, surveillance is emphasized as a promoter of health and a reducer of morbidity and mortality. Today we live in a food paradigm, in which the food industry offers processed and ultra-processed products, considered more attractive, but unhealthy [16]. In this scenario, fresh and minimally processed foods, considered healthy, need to compete with ready-to-eat foods [17].

The worker's food scenario, endorsed by the WFP allows for different operationalization modalities. Among the proposals, in the meal-agreement modality, the worker receives a ticket given by the beneficiary company for him to have his meals in commercial restaurants duly registered in the Program.

Data available in the "Total WFP Report" presented by the Ministry of Labour and Employment, show that from January 2005 to January 2022 there was an increase in the number of benefited workers, that is, from 8000987 to

10058456 and the Service Providers increased from 88 to 146 [18], increasing 25.71% and 65.91% respectively.

Several studies show a positive association between the WFP and the prevalence of obesity and overweight among workers [12, 13], which led to the regulation of the nutritional parameters of the WFP in Governmental Ordern.66, of August 25 2006 [5]. The WFP can represent a promising place in health and nutrition actions in the work environment [11]. However, in 2021 this ordinance loses effect, as it was replaced by the guidelines of Decree n.10.854, of November 10, 2021 [2], which does not define nutritional parameters.

Although there is no global study in Brazil with the objective of evaluating the relationship between the performance of the WFP and the health of the worker, after 45 years of its existence, what can be inferred, from specific studies, is the non-achievement of its objective, that is, to improve the nutritional status of workers. Furthermore, with the new guidelines that regulate the WFP, Governmental Order n.672/2021 [3], there is a greater risk of breaking the proposals that guarantee the food and nutrition security of Brazilian workers.

Given the above, the aim of the study was to propose a measurement instrument to assess healthy food choices in buffets in self-service restaurants.

2. Materials and Methods

This is a cross-sectional study carried out in self-services restaurants that are agreements with the WFP. It was used a research database carried out from December 2018 to January 2019. The sample was proportionally subdivided according to the number of workers benefited. The sample was divided according to planning areas (PA), namely: PA1, Downtown (91.49%), PA2, Botafogo (58.14%), PA3, Bonsucesso (35.11%), PA4, Barra da Tijuca (72.29%) and PA5 at Campo Grande (38.00%).

In step 1, a measurement instrument called “Checklist to verify whether foods, food preparations and beverages offered at buffet of the restaurants, in the meal-agreement modality of the WFP, contributed to a healthy diet, according to the theoretical assumptions showed in the Food Guide for the Brazilian Population [16].

The instrument has three columns: food group (first column), food/food preparations/beverages (second column) and intensity of scores from 1 to 5 (third column). Scores 1 and 2 denote possible unhealthy meals and scores 4 and 5, healthy. Score 3 is the median point (Table 1). The items to compose the first column were based on proposals for menu structures by the authors Silva [19] and Domene [20], with the necessary adaptations. In order to detail the offer of food, food preparations and drinks in the buffets of each restaurant, visits were carried out by one of the researchers in five restaurants located in each of the APs. The interaction between the information obtained in the literature and that obtained in visits made by one of the researchers made it possible to organize the food groups with their respective foods, food preparations and beverages. The

preparations that include the groups from G1 to G5 and G9, allow healthy meals, the others, unhealthy (Table 1).

Table 1 “Checklist to verify whether foods, food preparations and beverages offered in self-service buffets at convenient restaurants with the Worker's Food Program contribute to healthy eating. Rio de Janeiro, RJ, Brazil.2019

Self-service restaurant	Food / Food preparations / Beverages	Scores				
		1	2	3	4	5
G1: Leafy vegetables						
G2: Non-leaf vegetables						
G3: Fruits						
G4: Cold dishes						
G5: Hotdishes						
G: 6 Fried foods						
G7: Pasta						
G8: Fried protein foods						
G9: Protein foods roasted, cooked or grilled						
G10: Breaded protein foods						
G11: Bakery						
G12 Sweet foods						
G13: Beverages (industrialized juices and soft drinks)						

Initially, to assess the validity of the checklist, the “face validity” procedure was used, which consists of the evaluation of the test content by experts, in order to verify if they are appropriate for the purpose for which they are intended [21, 22]. For this purpose, a convenience sample with five judges was created. Teachers with regency in the discipline "Collective Feeding" participated. In the present case, the checklist models the latent trait, that is, the possibility of a buffet that underlies healthy eating.

In the “face validity” procedure, judges verified whether the foods, food preparations and beverages allocated to each group corresponded semantically, idiomatically, culturally, conceptually and dietary to the intended group.

When evaluating the instrument, each judge must carefully read each food group and its corresponding foods, food preparations and beverages to assess whether they are allocated coherently. Then, each judge credits a single score, ranging from 1 to 5, for each food group (Table 1). Scores 1 (one) and 2 (two) represent “unhealthy eating”, scores 4 (four) and 5 (five) “healthy eating” and score 3 is the median point. It was recommended to the judge that, when evaluating the instrument, they did not consider the variety of foods within each group, but the offer of food, food preparation and drinks, according to the assumptions of healthy eating according to the Food Guide for the Brazilian Population-2014 [16].

The Friedman test was used to verify a significant difference between the evaluation of the judges in relation to the food groups that would allow a healthy diet (G1 to G5 and G9) and others (G5 and G9) and the others (G6, G7, G8, G10, G11, G12 and G13), unhealthy eating.

Once the “face validity” of the checklist was confirmed, its reliability was performed using the Generalization Theory [23, 24] using the scores assigned by the judges. The essence of Generalization theory is to recognize that in a measurement situation there are multiple potential sources of error called by Shavelson and Webb [23] facets.

In this model, three facets were included: items from the food group (fixed facet), restaurant buffets and specialists (random facets), performed on a single occasion. Nway ANOVA, sowed by application Stata Corp LP, College Station Computer program, Version 12 [25] was used to calculate variance (VAR) due to judges, restaurant buffets, food group items, and the interaction among these facets. It is a crossover model, where all items in the food group are observed at each level of each facet and nested, that is all levels of one facet are paired with levels of another facet [23]. The reliability calculation, Coefficient G (CG), is given by the following expressions:

G Interaction among restaurant buffets:

$$\frac{(\text{VAR}_{\text{item}} + \text{VAR}_{\text{buffets/item}})}{(\text{VAR}_{\text{item}} + \text{VAR}_{\text{judge/item}} + \text{VAR}_{\text{buffets/item}} + \text{var}_{\text{buffets/judge/item}})}$$

G Interaction among judges

$$\frac{(\text{VAR}_{\text{item}} + \text{VAR}_{\text{judge/item}})}{(\text{VAR}_{\text{item}} + \text{VAR}_{\text{judge/item}} + \text{VAR}_{\text{buffet/judge}} + \text{VAR}_{\text{buffets/judge/item}})}$$

G general: food group item for different judges on different buffets

$$\frac{[\text{VAR}_{\text{item}} / (\text{VAR}_{\text{item}} + (\text{VAR}_{\text{judge}}) / n) + \text{VAR}_{\text{buffets/judge}} + (\text{VAR}_{\text{buffets/judge/item}}) / n]}$$

Where n= number of the judge

In Step 2, the checklist, after being validated, was applied to evaluate buffets in 30 restaurants. The sample was evaluated post hoc which computed the alpha power (0.05), sample size (30) and effect size (0.10). These restaurants were among the planning areas with the highest concentration of restaurants: PA1 Downtown, PA2 Botafogo and PA3 Bonsucesso.

The Kruskal-Wallis test was used to compare food groups as independent samples and to verify whether these independent samples differ from each other. Since each group operationalizes healthy or unhealthy food, it is expected that there will be a difference. Then, Dunn's test of multiple comparisons was used to identify differences in the confrontation of food groups.

Statistical analyses were performed with STATA version 12, Graph Pad Prism version 4.02 and G*Power 3.1.9.7 applications.

3. Results

The evaluation of the “face validity” was performed by nine judges who evaluated five buffets of self-service restaurants that have agreements with the WFP. The Friedman test showed that there was no significant difference in the judges assessment ($P_{\text{value}}=0.1149$, $F=12.91$). When was analysed the values of the scores of each group given by the judges, it could be seen that the food group G4 (Cold dishes) obtained a median value of eight when the other groups varied between 18 and 25. These results suggest that Group G4

should be migrated to the “unhealthy foods” category (data not shown in table).

Next, the scores of these judges were computed for the analysis of the reliability of the checklist by Generalization Theory (Table 3). Before the analyses, the Doornik-Hansen test was performed, which attested to the adherence of the scores to the multivariate normal distribution, since the observed Chi-square test statistic (n=195 observations) with 2 degrees of freedom presented a value of 36.324 ($P_{\text{value}}=0.0000$).

The reliability estimates of the checklist to assess whether buffets at self-service restaurants allow healthy food choices (*in natura* and/or minimally processed foods) had a G coefficient of 0.9822, 0.9500 and 0.9468 for interactions: among judges, among restaurant buffets and among food group items evaluated by judges for restaurant buffets (Table 2), indicating expressive levels in relation to the three facets considered in the generalization model, considering that the G4 group migrated to the unhealthy category.

Estimates of population variance (mean square) indicated that the interaction between item#judge and judge#buffet was the most relevant (Table 2). These results allow us to infer that the judges when evaluating the checklist were focused on whether the buffets met the requirements of a healthy diet.

The F statistic ($F=0.00$ $\text{Prob}>1.0000$) indicated that not all facets are equal at the significance level of 0.05, which corroborates differences in the evaluation of expert judges in relation to the facets considered in the model (Table 2).

The goodness of fit given by Root Mean Square Error (RMSE) =0.0000 indicated plausibility of the model and the coefficient of determination ($R^2=1.00$), that the model adequately fitted the data. These statistics infer on the reliability of the measurement instrument, called in the present study “Checklist” (Table2).

Table 2: Reliability of the instrument “Checklist to verify that foods, food preparations and beverages offered in buffets of self-service restaurants, agreed with the Worker's Food Program (n=5), evaluated by judges experts in Food Collective (n=9). Rio de Janeiro, RJ, Brazil.2019.

Variation Source	Partial SQ	GL	QM
Model	2730	194	14.0721
Judge	1.3617e52	2	6.8085e-53
Buffet	2.6089e53	4	
Item	.	12	
Item # judge	3.5533e-27	24	1.4806e-28
Item # buffet	2.9719e-27	48	6.1914e-29
Judge # buffet	7.4277e-54	8	9.2846e-55
Item # judge # buffet	2.6556e-26	96	2.7662e-28
Residual	0	0	
Total	2730	194	14, 0721649
$R^2: 1.00$	RMSE: 0.0000	$F=0.00>\text{Prob}>f 1.0000$	
Reliability of the instrument Coefficient G			
G interaction among judges			0.9822
G interaction among buffets			0.9500
G general: interaction between food group			0.9468

items evaluated by expert judges for restaurant buffets	
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Source: Prepared by the authors.

n= 195 observations.

Item: food, food preparations, drinks

Nway ANOVA. SQ: sum of squares; GL: degree of freedom; QM: mean square (estimate of population variance); R²: coefficient of determination; RMSE: Root Mean Square Error: measure that calculates the root mean square error between observed and predicted values.

After the validation of the checklist, it was applied to a sample of 30 restaurants and the sample was evaluated by Post hoc test using the parameters: Goodness of fit test–Contingency Tables for sample size noncentrality $\lambda=0.30$, critical chi-square=11.0705 and power (1-err prob) = 0.06. The power of the test below 0.80 indicates the absence of external validity, and can only be considered the presence of internal validity (Figure 1).

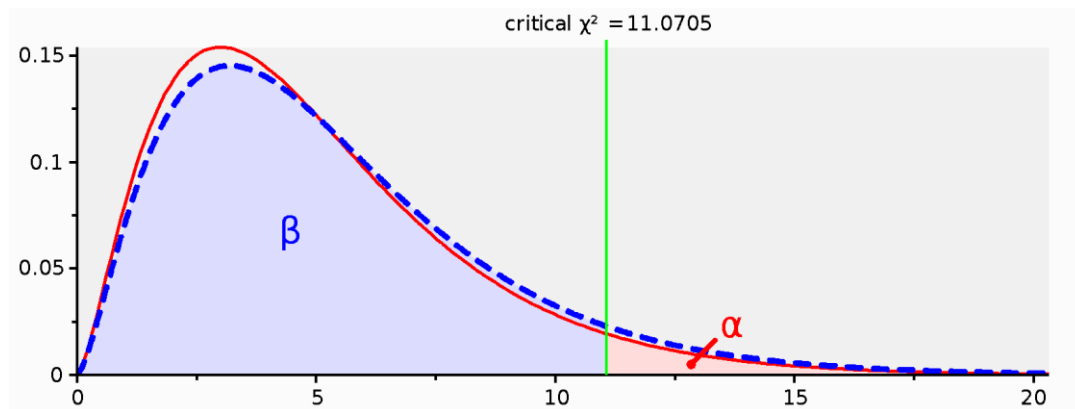


Figure 1: Post hoc test, Goodness of fit test–Contingency Tables, of the application of the instrument “Checklist in buffet at self-service restaurants (n=30), with agreement with the Worker's Food Program. Rio de Janeiro, RJ, Brazil.2019. Rio de Janeiro, RJ, Brazil.2019

The application of the checklist in the 30 self-service restaurants showed that the estimated proportions for the scores "4 and 5", which operationalize a healthy diet, were expressive for G1: Leafy vegetables, G2: Non-leaf vegetables, G3: Fruits, G5: Hot dishes and G9: Protein foods roasted, cooked or grilled. However, unhealthy foods are offered, scores “1 and 2”, also expressively, namely, G6: Fried food, G7: Pasta, G12: Sweet foods and G13: Beverages (industrialized juices and soft drinks). Group G8: Fried protein foods were distributed with percentages around 40% for score 1, unhealthy, or did not exist at the buffet. The absence of the G11: Bakery, unhealthy foods, in the majority of buffets was surprising (Table 3).

Table 3: Assessment of buffets at self-service restaurants with an agreement with the Worker's Food Program (n=30), according to food groups. Municipality of Rio de Janeiro, RJ, Brazil.2019

Food group	Score	Proportion	Standard error	IC95%
G1	4	0.16	0.06	0.25-0.30
	5	0.83	0.06	0.69-0.97
G2	4	0.16	0.09	0.25-0.30
	5	0.83	0.09	0.69-0.97
G3	0	0.20	0.07	0, 04-0, 35
	4	0.20	0.07	0.04-0.35
	5	0.60	0.09	0.41-0.78
G4	0	0.10	0.05	-0, 01-0, 21
	1	0.03	0.03	-0.03-0.10
	3	0.50	0.09	0.31-0.68
G5	4	0.30	0.08	0.12-0.47
	5	0.04	0.04	-0.02-0.16
	3	0.10	0.05	-0.01-0.21
G6	4	0.33	0.08	0.15-0.51
	5	0.56	0.09	0.37-0.75
	0	0.06	0.04	-0.02-0.16
G7	1	0.93	0.04	0.83-1.02

G7	0	0.03	0.03	-0, 03-0.10
	1	0.53	0.92	0.34-0.72
	2	0.26	0.08	0.09-0.43
G8	3	0.16	0.06	0.02-0.30
	0	0.43	0.09	0.24-0.62
	1	0.43	0.09	0.24-0.62
G9	2	0.06	0.04	-0.02-0.16
	3	0.06	0.04	-0.02-0.16
	3	0.06	0.04	-0.02-0.16
G10	4	0.63	0.08	0.45-0.81
	5	3.00	0.08	0.12-0.47
	0	0.20	0.07	0.04-0.35
G11	1	0.80	0.07	0.64-0.95
	0	0.83	0.06	0.69-0.97
	1	0.10	0.05	-0.01-0.21
G12	2	0.06	0.04	-0.02-0.16
	0	0.13	0.06	0.00-0.26
	1	0.83	0.06	0.69-0.97
G13	2	0.03	0.03	-0.03-0.10
	1	0.86	0.06	0.73-0.99
	2	0.13	0.06	0.00-0.26

Source: Prepared by the authors

G1: Leafy vegetables; G2: Non-leaf vegetables; G3: Fruits; G4: Cold dishes; G5: Hot dishes; G6 Fried foods; G7: Pasta; G8: Fried protein foods; G9: Protein foods roasted, cooked or grilled; G10 Breaded protein foods; G11: Bakery; G12 Sweet foods; G13: Beverages (industrialized juices and soft drinks). Buffet classification parameters-Healthy: groups from G1 to G5 and G9; Unhealthy: groups G6 to G8, G10 to G13.

The findings showed that the 30 buffets of self-service restaurants presented both healthy and unhealthy foods in their buffets.

4. Discussion

The use of “face validity”, in which five judges participated, allowed subjectively showing the relevance of food groups for the construction of the checklist. “Face validity” was also used by Schönberg et al. [26] to develop an inventory entitled “The Home Cooking Environment and equipment Inventory observation form” – “Home-CookERI™”. In the present study, in addition to the “face validity” of the checklist, the reliability of the judgment of these judges was evaluated, in a quantitative perspective.

The use of Generalization Theory to indicate the reliability of the checklist opens possibilities for validating instruments as a contribution to public policies on food and nutrition specifically for workers' health.

The findings showed that the 30 buffets of self-serving restaurants that are agreement with WFP presented both healthy and unhealthy foods and preparations. The assumption that the worker can freely choose what he will consume, in this modality, overestimates the effects of healthy eating, considering that there is little nutritional knowledge about the food offered at buffets by lay people, in this case, workers. This situation can harm to achievement the objectives of the WFP, which is to improve the nutritional status of workers. Thus, it is likely that, although the restaurants visited present buffets with healthy and unhealthy foods, it cannot be guaranteed that the exposure to ultra-processed foods does not affect the choices in the composition of the meals to be consumed. This could probably explain the significant difference between the food groups when evaluated by the expert judges.

Nutritional inadequacies in the meals offered are not restricted to self-service restaurants, but they extend to other WFP modalities, such as self-management and outsourcing, which are widely documented in the literature [7, 10, 27]. However, in the self-service modality, there is a greater possibility of the worker not having an adequate and healthy diet when considering the purchase of food in establishments such as cafeterias, which serve fast food. According to Bezerra et al. [28], individuals who have meals in cafeterias spend almost three times less on food purchases than those who choose restaurants.

If the price is paid by the weight of the dish served [29] the possibility of excesses would be reduced. However, there is no guarantee that such logical and economical behavior will prevail. Meal weight may be reduced quantitatively, but nutritional quality may remain inadequate.

For all the modalities foreseen with the agreement with the WFP, it is necessary to monitor the nutritional quality of the meal and, for that, Bandoni and Jaime [6] suggest the use of adequate instruments to evaluate the meals offered so that the WFP can be consolidated as a policy to promote adequate and healthy food. This suggestion allows us to infer about the importance of the present study, by creating an instrument to help in the registration of restaurants with a view to achieving the food quality of the meals offered. The instrument can be considered promising, considering that the

adjustment indices and the adequacy coefficient were shown to be parsimonious for the purposes for which it is intended.

In Collective Food, the promotion of adequate and healthy food is the major challenge, particularly when is used commercial self-service restaurants. In this situation, the possible solution lies in engaging managers capable of promoting food and nutrition education programs. These programs point the way to healthy eating and, consequently, to health promotion [30]. However, this rule is not clear in the current Governmental Order n.672/2021 [3].

It is important to highlight that the idea here is to present an instrument that helps managers from different governmental spheres, to know what happens public policy tip, in order to contribute with the changes of the behaviour about the food consumption between workers.

In 2006, a great advance was made towards the achievement of the main objective of the WFP by Governmental Ordern.66, of August 25 [5]. This document established the parameter for macro and micronutrients, as well as demanding that establishments linked to the WFP should promote food and nutrition education. With regard to the operational management of the program, all WFP modalities should have a technical person responsible for their execution. However, fifteen years later these assumptions necessary for the achievement of healthy food for the worker were abandoned, specifically in the food and nutritional guidelines and in the obligation of the technical responsible. The change was supported by Decree n.10.854, of November 10, [2]. However, the monitoring of the WFP directed towards the economic side of the Program, that is, was not forgotten, requiring analysis of the costs, effectiveness, and acceptance of payment instruments. In this perspective, the Ministry of Health remains without an injunction for inspection, only the regulation in the promotion of health and food and nutritional security is applicable, however practically without detail and consequently ineffective.

The study showed that the current meal plan system allows both healthy and unhealthy choices and the existence of the program is only valid if the federal sphere establishes management mechanisms for monitoring the WFP with the benefited companies, focusing on the nutritional monitoring of workers, nutritional profile of meals and Food and Nutrition Education activities.

Limitations on the findings of this study must be considered. Information regarding the type of food available for consumption in the restaurants in question was obtained by observing the buffets and not by actual food consumption. Regarding food preparations, there was no access to the food preparation technical record card, and it was not possible to identify specific characteristics of the foods used. The main limitation refers to the context in which it was applied: commercial restaurants agreement with WFP located in geographical areas of greater demographic expressiveness in the city of Rio de Janeiro, Brazil, therefore the external validity was not reached.

Regarding the contribution, the study may offer a method to validate an instrument for measuring the quality of meals for workers using the Generalization Theory, an unusual methodology in Collective Food. In this sense, the questionnaire can be used in future studies on Collective Food, increasing the possibilities of producing scientific knowledge. Its objectivity, as it presents 13 food groups, facilitates its application and use. It is also suggested to analyse whether other food groups can also be indicated for measuring the nutritional quality of restaurants agreement with WFP.

5. Conclusions

The study showed evidence of “face validity” and reliability of the checklist to assess whether foods, food preparations and beverages offered at buffet restaurants self-serve agreement with WFP approximate possible healthy food choices. The findings showed that the 30 buffets of restaurants evaluated had both healthy and unhealthy foods and preparations in their buffets. Given the above, food and nutrition education interventions are recommended so that the choices had been those to further the health of the worker. In this scenario, it is necessary that the workers have knowledge about food and nutrition. The dissemination of recommendations that value the consumption of a diet which prioritizes fresh foods in place of ultra-processed food may be one of the ways to change the eating habits of workers.

Ethics approval and consent to participate

This study is part of the research project “Food Safety in Meal Producing Units”, approved by the Research Ethics Committee of the Faculty of Medicine/University Hospital Antônio Pedro, under the protocol CEP CMM/HUAP, n.374/11, CAAE: 0390.0.258-11. The expert judges, after being clarified about the research objectives and acquiescing about their participation, signed the “Free and Informed Consent Term”.

List of abbreviations

Coefficient of determination (R²)
Food group (G)
Friedman's Test (F)
Kruskal-Wallis (KW)
Planning Area (PA)
Reliability by Generalization Theory-Generalization Coefficient (GC)
Root Mean Square Error (RMSE)
Variance (VAR)
Worker's Food Program (WFP)

Data Availability

Access to data that supported the study: haydeelan[at]gmail.com

Conflicts of Interest

The authors declare that they have no current or potential financial, personal or institutional conflicts of interest. Rio de Janeiro, RJ, Mai 05, 2022.

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Authors' contributions

The authors Elizabeth Gonçalves Lima, HaydéeSerrãoLanzillotti, Roseana Moreira Sampaio Barbosa e Maria Elisa Barros that they are responsible for preparing the manuscript entitled WORKER FOOD PROGRAM: do buffet restaurants allow healthy eating? “Elizabeth Gonçalves Lima and Maria Elisa Barros were the creators of the study, HaydéeSerrãoLanzillotti modelled the method, Elizabeth Gonçalves Lima was responsible for the data collection in sample units, data mining and data analysis, Roseana Moreira Sampaio Barbosa and Maria Elisa Barros performed the critical review.

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Supplementary Materials

There was no supplementary material

References

- [1] Lei n.6.321 de 14 de Abril de 1976 (1976). Dispõe sobre a dedução, do lucro tributável para fins de imposto sobre a renda das pessoas jurídicas, do dobro das despesas realizadas em programas de alimentação do trabalhador. Brasília, DF. Accessed 7th November, 2021. Available: <https://legislacao.presidencia.gov.br/atos/?tipo=LEI&numero=6321&ano=1976&ato=6651TWU50MnRVTc2b>. Portuguese.
- [2] Decreto n.10.854, de 10 de Novembro de 2021. (2021). Regulamenta disposições relativas à legislação trabalhista e institui o Programa Permanente de Consolidação, Simplificação e Desburocratização de Normas Trabalhistas Infralegais e o Prêmio Nacional Trabalhista, e altera o Decreto nº 9.580, de 22 de novembro de 2018. Brasília, DF. Accessed 10th January 2022. Available: <https://www.in.gov.br/en/web/dou/-/decreto-n-10.854-de-10-de-novembro-de-2021-359085615>. Portuguese.
- [3] Portaria n.672, de 8 de novembro de 2021. (2021). Disciplina os procedimentos, programas e condições de segurança e saúde no trabalho e dá outras providências. Brasília, DF. Accessed 10th January 2022. Available: <https://www.in.gov.br/en/web/dou/-/portaria-n-672-de-8-de-novembro-de-2021-359091010>. Portuguese.
- [4] Fracalossi, M. G. Consumo alimentar por trabalhadores da área da saúde de Porto Alegre (dissertação). Porto Alegre: Universidade Federal de Ciências da Saúde de Porto Alegre, RGS, Brasil, 2020. Accessed 7th November, 2021. Available: <https://repositorio.ufcspa.edu.br/jspui/bitstream/123456789/1706/1/5BDISSERTA%20C3%87%20C3%83O%20Fracalossi%20Mic%20hele%20Girolometto.pdf>. Portuguese.
- [5] Portaria Interministerial nº66, de 25 de agosto de 2006 (2006). Altera os parâmetros nutricionais do Programa de Alimentação do Trabalhador – PAT. Brasília, DF. Accessed 7th November, 2021. Available: http://189.28.128.100/nutricao/docs/legislacao/portaria66_25_08_06.pdf. Portuguese.

- [6] Bandoni DH, Brasil BG, Jaime P. C. Programa de Alimentação do Trabalhador: representações sociais de gestores locais. *Revista de Saúde Pública*.2006; 40: 5, 837-42. Accessed 7th November 2021. Available: <https://doi.org/10.1590/S0034-89102006000600013>. Portuguese.
- [7] Sousa FA, Oliveira Silva RC, Fernandes CE. Avaliação nutricional de cardápios em unidades de alimentação e nutrição: adequação ao programa de alimentação do trabalhador. *VEREDAS FAVIP. Revista Eletrônica de Ciências*.2009; 2: 1, 44-50. Accessed 7th November, 2021. Available: <http://blog.devrybrasil.edu.br/ojs/index.php/veredas1/article/view/121/238>. Portuguese.
- [8] Cunha RO, Barbosa RMS. Avaliação dietética das refeições ofertadas aos colaboradores de empresa cadastrada no Programa de Alimentação do Trabalhador. *Demetra*.2014; 9: 4, 963-974. Accessed 7th November, 2021. Available: <http://dx.doi.org/10.12957/demetra.2014.11748>. Portuguese.
- [9] Salvetti LH, Possa G. Programa de alimentação do trabalhador e qualidade nutricional das refeições. *Ciência&Saúde*.2017; 10: 1, 23-27. Accessed 7th October, 2021. Available: <https://doi.org/10.15448/1983-652X.2017.1.23634>. Portuguese.
- [10] Canella DS, Bandoni DH, Jaime PC. (2011). Densidade energética de refeições oferecidas em empresas inscritas no Programa de Alimentação do Trabalhador no município de São Paulo. *Revista de Nutrição*, 2011; 24: 5, 715-724. Accessed 7th October, 2021. Available: <https://doi.org/10.1590/S1415-52732011000500005>. Portuguese.
- [11] Sarno F, Bandoni, DH, Jaime PC. Excesso de peso e hipertensão arterial em trabalhadores de empresas beneficiadas pelo Programa de Alimentação do Trabalhador (PAT). *Revista Brasileira de Epidemiologia*.2008; 11: 1, 453-62. Accessed 10th September, 2021. Available: <https://doi.org/10.1590/S1415-790X2008000300012>. Portuguese.
- [12] Araújo MS, Costa THM, Schmitz BAS, Machado LMMM., Santos WRA. (2010). Fatores associados ao sobrepeso e adiposidade central em trabalhadores urbanos assistidos pelo Programa de Alimentação do Trabalhador da região amazônica do Brasil. *Revista Brasileira de Epidemiologia*.2010; 13: 3, 425-33. Accessed 10th October, 2021. Available: <https://doi.org/10.1590/S1415-790X2010000300006>. Portuguese.
- [13] Chaves MJ. Programa de Alimentação do Trabalhador relacionado com sobrepeso e obesidade: uma revisão sistemática. *Revista Brasileira de Obesidade, Nutrição e Emagrecimento*.2012; 6: 34, 178-183. Accessed 11th October, 2021. Available: www.ibpefex.com.br/www.rbone.com.br. Portuguese.
- [14] Hoffmann R, Santiago L AT. O auxílio alimentação no Brasil: seu efeito na distribuição da renda e no Índice de Massa Corporal dos empregados, conforme dados da Pesquisa de Orçamentos Familiares de 2008-2009. *Segurança Alimentar e Nutricional*.2017; 24: 2, 83-100. Accessed 11th October, 2021. Available: <http://dx.doi.org/10.20396/san.v24i2.8650197>. Portuguese.
- [15] Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Análise em Saúde e Vigilância de Doenças Não Transmissíveis. *Vigilante Brasil 2019: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico: estimativas sobre frequência e distribuição sociodemográfica de fatores de risco e proteção para doenças crônicas nas capitais dos 26 estados brasileiros e no Distrito Federal em 2019*. Brasília, DF: Ministério da Saúde; 2020. Accessed 11th September, 2021. Available: https://bvsms.saude.gov.br/bvs/publicacoes/vigilante_brasil_2019_vigilancia_fatores_risco.pdf. Portuguese.
- [16] Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. *Guia alimentar para a população brasileira / Ministério da Saúde, Secretaria de Atenção à Saúde, Departamento de Atenção Básica*. 2th. ed. Brasília: Ministério da Saúde, 2014. Accessed 6th Mai 2022. Available: https://bvsms.saude.gov.br/bvs/publicacoes/guia_alimentar_populacao_brasileira_2ed.pdf. Portuguese.
- [17] Monteiro CA, Cannon G, Levy R et al. NOVA. A estrela brilha. [Classificação dos alimentos. *SaúdePublica*]. *World Nutrition*, 2016 7 (1-3), 28-40. Accessed 6th October 2021. Available: https://files.cercomp.ufg.br/weby/up/896/o/Nova_classifica%C3%A7%C3%A3o_dos_alimentos.pdf. Portuguese.
- [18] Ministério do Trabalho e Emprego. Coordenação do Programa de Alimentação do Trabalhador, COPAT. (2022). *Relatório Total PAT*. Brasília, DF: Accessed 9th Mai 2022. Available: <http://consulta.mte.gov.br/empregador/pat/relatorios/RelTotalPAT.asp>. Portuguese.
- [19] Silva SMCS. *Cardápio: guia prático para a elaboração*. São Paulo: Roca; 2008. Portuguese.
- [20] Domene SMA. *Técnica dietética: teoria e aplicações*. Rio de Janeiro: Guanabara Koogan; 2011. Portuguese.
- [21] Pasquali, L. Validade dos Testes Psicológicos: Será Possível Reencontrar o Caminho? *Psicologia: Teoria e Pesquisa*.2007; 23 (esp), 099-107. Accessed 6th September 2021 Available: <https://doi.org/10.1590/S0102-37722007000500019>. Portuguese.
- [22] Streiner, DL, Norman GR. *Health Measurement Scales: A practical guide to their development and use*. Oxford: Oxford University Press; 2008.
- [23] Shavelson RJ, Webb NM. *Generalizability Theory: A Primer Measurement Methods for the Social Science Book 1r*. London: SAGE Publications; 1991.
- [24] Suen HK, Lei PW. Classical versus Generalizability theory of measurement. *Educational Measurement*.2007; 4, 1-13. Accessed 5th August 2021. Available: <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.549.6380&rep=rep1&type=pdf>.
- [25] Stata Corp LP, College Station [Computer program]. Version 12: *Stata Structural Equation Modeling Reference: manual release 12*. College Station: Stata Press Publication; 1985-2011. Accessed 1th August 2021. Available: <https://www.stata.com/>
- [26] Schönberg S, Asher R, Stewart S et al. Development of the Home Cooking Environment and Equipment Inventory Observation form (Home-CookERITM): An Assessment of Content Validity, Face Validity, and

- Inter-Rater Agreement. *Nutrients*.2020; 12: 2-21. Accessed 5th August 2021. Available: <https://doi.org/10.3390/nu12061853>
- [27] Howarth NC, Murphy SP, Wilkens LR, Hankin JH, Kolonel, LN. Dietary energy density is associated with overweight status among 5 ethnic groups in the Multiethnic Cohort Study. *Journal of Nutrition*.2006; 136 (8), 2243-8. Accessed 5th August 2021. Available: <http://doi:10.1093/jn/136.8.2243>.
- [28] Bezerra, IN, Moreira, TMV, Cavalcante, JB, Souza, AM, Sichieri R. Consumo de alimentos fora do lar no Brasil segundo locais de aquisição. *Revista de Saúde Pública*.2017; 51 (15), 1-8. Accessed 10th August 2021. Available: <https://doi.org/10.1590/S1518-8787.2017051006750>. Portuguese.
- [29] Santos, MV, Proença RPC, Fiates GMR, Calvo MCM. Os restaurantes por peso no contexto de alimentação saudável fora de casa. *Revista de Nutrição*.2011; 24 (4), 641-649. Accessed 4th Mai 2021. Available: <https://doi.org/10.1590/S1415-52732011000400012>. Portuguese.
- [30] Ministério do Desenvolvimento Social e Combate à Fome [MDSCF]. (2012). Marco de referência de educação alimentar e nutricional para as políticas públicas. Brasília: Ministério do Desenvolvimento Social e Combate à Fome. Accessed 5th September 2021. Available: https://www.cfn.org.br/wp-content/uploads/2017/03/marco_EAN.pdf. Portuguese.