Nutrición Hospitalaria

Nutr Hosp. 2015;32(4):1796-1801
ISSN 0212-1611 • CODEN NUHOEQ
S.V.R. 318

Original/*Otros*

Assessment of good practices in hospital food service by comparing evaluation tools

Juliana Macedo Gonçalves[1], Kelly Lameiro Rodrigues[2], Ângela Teresinha Santiago Almeida[2], Giselda Maria Pereira[3] and Márcia Rúbia Duarte Buchweitz[2]

[1]Programa de Posgrado en Nutrición y Alimentos, Universidad Federal de Pelotas, Pelotas, RS. [2]Departamento de Nutrición, Universidad Federal de Pelotas, Facultad de Nutrición, Pelotas, RS. [3]Departamento de Matemática y Estatística, Instituto de Física y Matemática, Universidad Federal de Pelotas, Pelotas, RS. Brasil.

Abstract

Introduction: **since food service in hospitals complements medical treatment, it should be produced in proper hygienic and sanitary conditions. It is a well-known fact that food-transmitted illnesses affect with greater severity hospitalized and immunosuppressed patients.**

Aims: **good practices in hospital food service are evaluated by comparing assessment instruments.**

Methods: **good practices were evaluated by a verification list following Resolution of Collegiate Directory n. 216 of the Brazilian Agency for Sanitary Vigilance. Interpretation of listed items followed parameters of RCD 216 and the Brazilian Association of Collective Meals Enterprises (BACME). Fisher´s exact test was applied to detect whether there were statistically significant differences. Analysis of data grouping was undertaken with Unweighted Pair-group using Arithmetic Averages, coupled to a correlation study between dissimilarity matrixes to verify disagreement between the two methods.**

Results and discussion: **Good Practice was classified with mean total rates above 75% by the two methods. There were statistically significant differences between services and food evaluated by BACME instrument. Hospital Food Services have proved to show conditions of acceptable good practices.**

Conclusion: **the comparison of interpretation tools based on RCD n. 216 and BACME provided similar results for the two classifications.**

(*Nutr Hosp*. 2015;32:1796-1801)

DOI:10.3305/nh.2015.32.4.9463

Key words: *Verification list. Good practice. Legislation.*

Correspondence: Márcia Rúbia Duarte Buchweitz.
Departamento de Nutrición, Universidad Federal de Pelotas,
Facultad de Nutrición. Calle Gomes Carneiro, n.º 1,
Campus Universitario Porto, CEP 96010-610, Pelotas, RS, Brasil.
E-mail: marciabuchweitz@yahoo.com.br

Recibido: 16-VI-2015.
Aceptado: 26-VII-2015.

ANÁLISIS DE LAS BUENAS PRÁCTICAS EN SERVICIOS DE ALIMENTACIÓN HOSPITALARIOS, COMPARANDO INSTRUMENTOS DE EVALUACIÓN

Resumen

Introducción: **por ser un adyuvante al tratamiento médico, la alimentación hospitalaria debe ser producida en adecuadas condiciones higiénicas y sanitarias, considerando qué enfermedades transmitidas por los alimentos afectan con mayor severidad a pacientes hospitalizados e inmunodeprimidos.**

Objetivos: **evaluar la adopción de buenas prácticas en los servicios de alimentación hospitalarios, comparando instrumentos de evaluación.**

Métodos: **la evaluación de las buenas prácticas fue realizada utilizando una lista de verificación conforme la Resolución de Directora Colegiada – RDC n.º 216 de la Agencia Nacional de Vigilancia Sanitaria. Para la interpretación de los ítems listados fueron utilizados los parámetros de la RDC n.º 216 y de la Asociación Brasileña de Empresas de Comidas Colectivas (ABERC). Se aplicó el test exacto de Ficher para analizar si existían diferencias estadísticamente significativas y también fue realizado un análisis de agrupamiento de los datos per el método *Unweighted Pair-group using Arithmetic Averages* y un estudio de la correlación entre las matrices de disimilitud, objetivando verificar la concordancia entre los dos métodos de diagnóstico.**

Resultados y discusión: **las buenas prácticas fueron clasificadas con valores medios totales superiores al 75% de adecuación, en los dos instrumentos utilizados. Se observaron diferencias estadísticamente significativas entre los servicios y la alimentación evaluados por el instrumento de la ABERC. Los servicios de alimentación hospitalarios, de modo general, presentaron condiciones de buenas prácticas aceptables.**

Conclusión: **la comparación de los instrumentos de interpretación basados en la RDC n.º 216 y ABERC mostró resultados semejantes en ambas clasificaciones.**

(*Nutr Hosp*. 2015;32:1796-1801)

DOI:10.3305/nh.2015.32.4.9463

Palabras clave: *Lista de verificación. Buenas prácticas. Legislación.*

Introduction

A hospital's Food Service (FS) comprises the sector that caters for meals to hospital staff, patients and their kin by attending to a diet therapy regime and enhancing nutrition education. Since food in hospitals is a complement to medical treatment, it should be produced in adequate hygienic and sanitary conditions, due to the fact that food-transmitted diseases affect hospitalized and immunosuppressed patients with greater severity. Consequently, the implementation of strict practices in sanitary safety during the production of hospital meals is mandatory and thus more organic harm may be avoided to the subjects' already compromised health conditions[1,2].

Good Practice (GP) may be defined as a set of procedures that should be adopted by FS to warrant hygiene and sanitary quality according to the law. It is rather a wide term and comprises items such as environmental conditions, installations, reception and storing of food, maintenance, hygiene and disinfection of equipments, utensils and work places, pest control, drinkability of water and cleanliness of the people who handle food[3].

The verification list for the diagnostic assessment of food processing conditions provides a fast and easy visualization of the negative and positive points and thus a detailed analysis of each site[4]. The Resolution of Collegiate Directory (RCD) n. 216 published by the Brazilian Agency of Sanitary Vigilance (BASV) lays down procedures for food service and evaluates their quality. However, the interpretation and quantification of risks are classified as conformant or not to current legislation[5]. Another assessment tool for Good Practice used by the Brazilian Association of Collective Meals Enterprises (BACME) is foregrounded on the same legislation (RCD n. 216) coupled to the dimension of inadequacies with regard to severity. This interpretation may be a great help in listing priorities for the introduction of recommended corrective measures[6].

Current analysis evaluated the implementation of Good Practice in food services in hospitals by comparing the assessment tools.

Methods

Sample

Current investigation was undertaken in four hospital Food Services in Pelotas RS Brazil, tagged as A, B, C and D.

Research project was analyzed and approved by the Committee for Ethics in Research of the Faculty of Dentistry of the Universidade Federal de Pelotas (Protocol 205/2011).

Assessment of Good Practice

GP in hospital FS was assessed by a verification list according to RCD n. 216[5] comprising the following items: premise, installations, equipment, furniture and utensils; hygiene of rooms; integrated control of vectors and pests; water supply; disposal of residues; handlers; raw material, ingredients and packaging; preparation of food; storing and transport of the product; shelf exposure; documents, registration and technical responsibility.

Interpretation of the verification list

The results from the verification list of RCD n. 216 were analyzed by two different classifications: a simplified classification based on RCD n. 216[5] and a classification with different scores according to the degree of severity of faults, based on BACME[6].

Items listed by RCD n. 216 were classified 'conformant', 'non-conformant' and 'not applicable'. The number of conformant items was added and given in numbers and percentages, whereas non-applicable items were excluded from final tally.

The BACME system required the classification of items according to risk level within the microbiological safety of the food and received different scores according to the level of severity in non-conformity. Score 2 meant low non-conformity level; score 5 was equivalent to average non-conformity level; score 10 equaled severe non-conformity level. Scores were then added and given in numbers and percentages, excluding the non-applicable items. The higher the score total, the better was the FS classification.

Statistical analysis

A descriptive analysis of data was performed with averages and percentages of the variables. After the analysis of variation test, Fisher's exact test was applied to verify whether there were statistically significant differences between the different food services with regard to conformant percentages for each item, with STATA[7] and SPSS 20.0[8] at 5% significance level.

Group analysis by Unweighted Pair-group using Arithmetic averages (UPGMA)[9] verified similarity between food services with regard to variables in each method. Dissimilarity measures were obtained by the complement of simple coincidence coefficient and mean Euclidian distance for the variables of the respective interpretation methods RCD n. 216 and BACME. Further, the co-relationship between dissimilarity matrixes was undertaken to verify any agreement between the methods. GENES[10] evaluated multivariate analyses.

Results and discussion

Tables I and II show Good Practice evaluated by RCD n. 216 and BACME, with mean total rates

Table I
Fitness of Good Practice, according to RCD n. 216[1], in hospital food services in the municipality of Pelotas RS Brazil, 2015

Assessed Items	Assessed Subitems n	FS[2] A	FS B	FS C	FS D	p-rate[3] (5%)
		Fitness n (%)	Fitness n (%)	Fitness n (%)	Fitness n (%)	
Premise	19	12 (63.2)	10 (52.6)	14 (73.7)	12 (63.2)	0.65
Hygiene	6	5 (83.3)	6 (100)	4 (66.7)	4 (66.7)	0.70
Pest control	4	4 (100)	4 (100)	4 (100)	4 (100)	–
Water supply	2	2 (100)	2 (100)	2 (100)	2 (100)	–
Residue management	3	1 (33.3)	1 (33.3)	3 (100)	2 (66.7)	0.59
Handlers	15	13 (86.7)	13 (86.7)	12 (80.0)	11 (73.3)	0.89
Raw material	7	7 (100)	7 (100)	7 (100)	6 (85.7)	1
Food Preparation	16	14 (87.5)	12 (75.0)	13 (81.3)	14 (87.5)	0.89
Storage	3	1 (33.3)	3 (100)	2 (66.7)	3 (100)	0.51
Shelf exposure	9	8 (88.9)	8 (88.9)	8 (88.9)	8 (88.9)	1
Documentation	3	3 (100)	3 (100)	3 (100)	3 (100)	–
Technical responsibility	2	2 (100)	2 (100)	2 (100)	2 (100)	–
Total	89	72 (80.9)	71 (79.8)	74 (83.2)	71 (79.8)	0.93

[1]RCD = Resolution of Collegiate Directory n. 216 - National Health Surveillance Agency.
[2]Food Service.
[3]p-rate (Fisher's exact test).

Table II
Fitness to Good Practice according to BACME[1] in hospital food services in the municipality of Pelotas RS Brazil, 2015

Items	Total of scores	FS[2] A		FS B		FS C		FS D		p-rate[4] (5%)
		Fitness		Fitness		Fitness		Fitness		
		P[3]	(%)	P	(%)	P	(%)	P	(%)	
Premise	139	87	(62.6)	62	(44.6)	97	(69.8)	79	(56.8)	< 0.001
Hygiene	50	45	(90)	50	(100)	35	(70)	35	(70)	< 0.001
Pest control	40	40	(100)	40	(100)	40	(100)	40	(100)	-
Water supply	20	20	(100)	20	(100)	20	(100)	20	(100)	-
Residue management	25	10	(40)	10	(40)	25	(100)	15	(60)	< 0.001
Handlers	112	97	(86.6)	92	(82.1)	87	(77.7)	82	(73.2)	0.240
Raw material	60	60	(100)	60	(100)	60	(100)	50	(83.3)	< 0.001
Food Preparation	140	120	(85.7)	105	(75)	115	(82.1)	130	(92.9)	0.066
Storage	20	5	(25)	20	(100)	15	(75)	20	(100)	< 0.001
Shelf exposure	75	65	(86.7)	65	(86.7)	65	(86.7)	65	(86.7)	1
Documentation	30	30	(100)	30	(100)	30	(100)	30	(100)	-
Technical responsibility	20	20	(100)	20	(100)	20	(100)	20	(100)	-
Total	731	599	(81.9)	574	(78.5)	609	(83.3)	586	(80.2)	0.186

[1]BACME = Brazilian Association of Collective Meals Enterprises.
[2]Food Service.
[3]P: scores.
[4]Fisher's exact test.

above 75% for all food services under analysis. Full (100%) fitness of the items "Pest Control", "Water Supply", "Documentation" and "Technical Responsibility" occurred for the two evaluated tools. The activities "Pest Control" and "Water Supply" are accounted for by the committees for the control of hospital infections which are extremely keen in the hospitals analyzed and have a strong influence on sanitary quality. The above explains the high percentage of fitness.

The item "Raw material" was similar in FS, except FS "D" with an 85.7% fitness difference according to RCD n. 216, and 83.3% according to BACME. Owing to the latter classification, it had a significant difference when compared to the other FS analyzed. Souza & Campos[11] underscored that periodic visits to suppliers may provide greater safety in the acquisition of products.

Only items "Management of residues" in FS "A" and "B" and "Food Storage" in FS "A" provided fitness percentages according to RCD n. 216 and final score according to ABERC lower than 50% of the expected score in the two tools. However, a statistically significant difference only occurred in assessment by BACME.

It must be underpinned that pedal touch-less waste bins were handled with open lids. The waste bins were not identified and frequently no separation between dry and organic wastes was extant. Veiros et al.[12] assessed GP in cafeterias and noted inadequate control of residues since waste bins were handled manually and no adequate garbage storage existed. Four out of ten internal waste bins without lids were reported in the six restaurants analyzed. Genta et al.[13] reported similar results to current research and suggested that the situation is common in FSs due to heavy service and short periods for handling tasks, with the consequent carelessness in closing the waste bins and in storing food residues.

The item "Food storage" had the lowest fitness percentages due to problems related to refrigeration. In fact, few refrigeration equipments were extant and no cold chambers. Space for non-perishable objects was inadequate and insufficient. Food for immediate consumption should be maintained in proper hygienic and sanitary conditions due to possible microbial development associated to inadequate time and temperature[2]. Lack of fitness seems to be a recurring problem in FSs. In their study on kindergartens in the city of São Paulo, Brazil, Oliveira et al. reported that 60% of food was inadequately stored[14].

In the case of item "Physical Structure", the FS "B" evaluated by BACME also had a lower than 50% fitness percentage (44.6%) and a significant difference when compared to other FSs by the two tools.

The items "Hygiene", "Food handlers", "Food preparation" and "Exposure of food for consumption" had a higher than 50% score in all FSs of the hospitals, even though not one had the expected full scores. Statistical analysis failed to show any significant difference among the hospitals with the exception of "Hygiene" by BACME. Oliveira et al. used a similar methodology to that of current analysis and detected a 60% inadequacy related to "Hygiene of premises, equipments and utensils"[14].

It should be emphasized that the hands of food handlers may be vectors in the dissemination of food-transmitted diseases. Periodic training of workers with an emphasis on the correct hygiene of hands, prohibition in using jewelry and other accessories during working hours and instructions to avoid crossed contamination is an alternative to lessen food contaminations risks[15]. Roto et al. concluded that information on hygiene by restaurant workers intervenes positively on food hygiene and cleanliness in the kitchen[16].

Positive results in current analysis may have occurred due to the fact that survey period with regard to the verification list was relatively short. No absolute certainty could be obtained that the guidelines and procedures in the handbooks on food handling were being totally complied with. Further, since assessment visits had to be previously scheduled there was always the possibility that places were prepared for the evaluation of the items, included food handling. Bas et al.[17] underscore that the guarantee for safe food depends on the adequate establishment of GPs and the elaboration of the GP handbook.

The statistical analysis of data reveals that there was no significant difference between FS by RCD n. 216 classification. However, there was significant difference for FS in the items "Physical Structure", "Hygiene, "Residue management", "Handlers", "Raw material", "Food Preparation" and "Storage", according to BACME classification. The difference may have existed due to the fact that BACME classification uses different scores to classify the items under analysis. They are more sensitive and complement corrective measures for the most relevant issues.

Grouping analysis showed that FSs "A", "B" and "D" analyzed by RCD n. 216 and BACME methods formed a single group due to their similarity. FS "C" formed a separate group, with great dissimilarities for the variables studied (Fig. 1). General results (Tables I and II) revealed that FS "C" had the best results with regard to hospitals "A", "B" and "D". The above may be due to the fact that the hospital of FS "C" is a small unit served by a totally private attendance. Grouping analyses were used to verify the similarity between services in hospital pharmacies to identify which hospitals were most similar[18].

The correlation between dissimilarity matrixes by the RCD n. 216 and BACME methods was 0.9607 and revealed concordant methods (Fig. 2). This boils down to the fact that results were similar by the two classifications. In other words, when a more detailed tool,

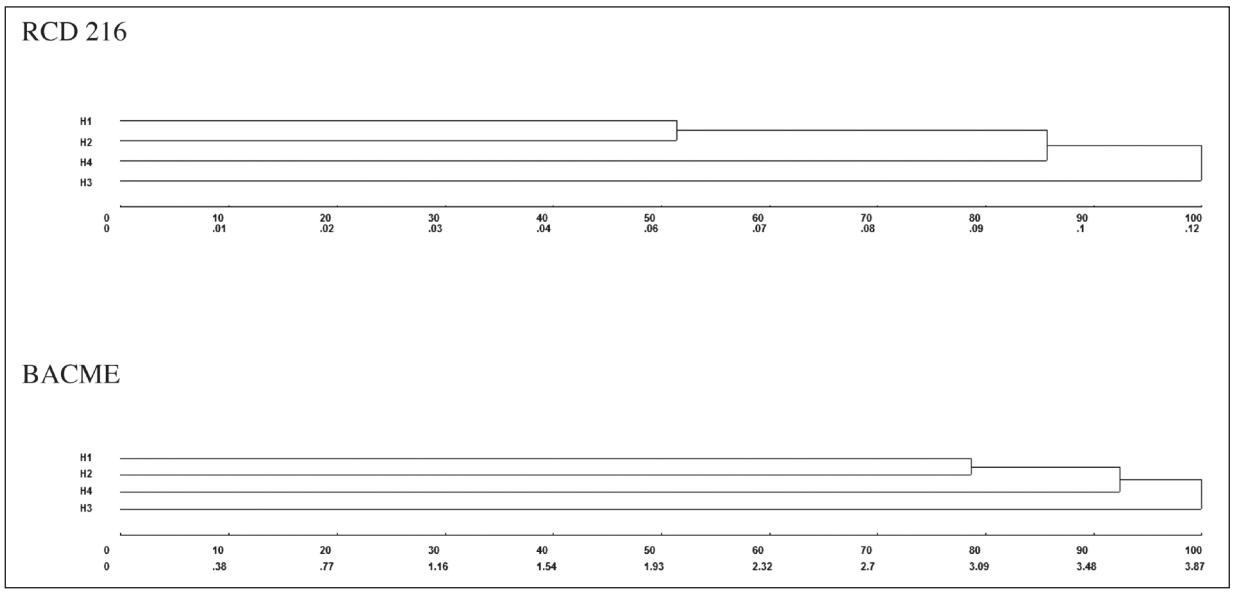

Fig. 1.—Dendrograms of groupings of the characteristics of hospital food services with RCD n. 216 and BACME using.

such as BACME classification with greater weight for the more critical issues, was employed, the irregularities were similar to the classification foregrounded on the RCD n. 216 interpretation tool which fails to distinguish between issues but merely counts the unconformities.

Conclusions

As a rule, hospital food services provided acceptable GP conditions, even though items "Residue management", "Storage" and "Physical structure" must be the object of immediate corrective actions.

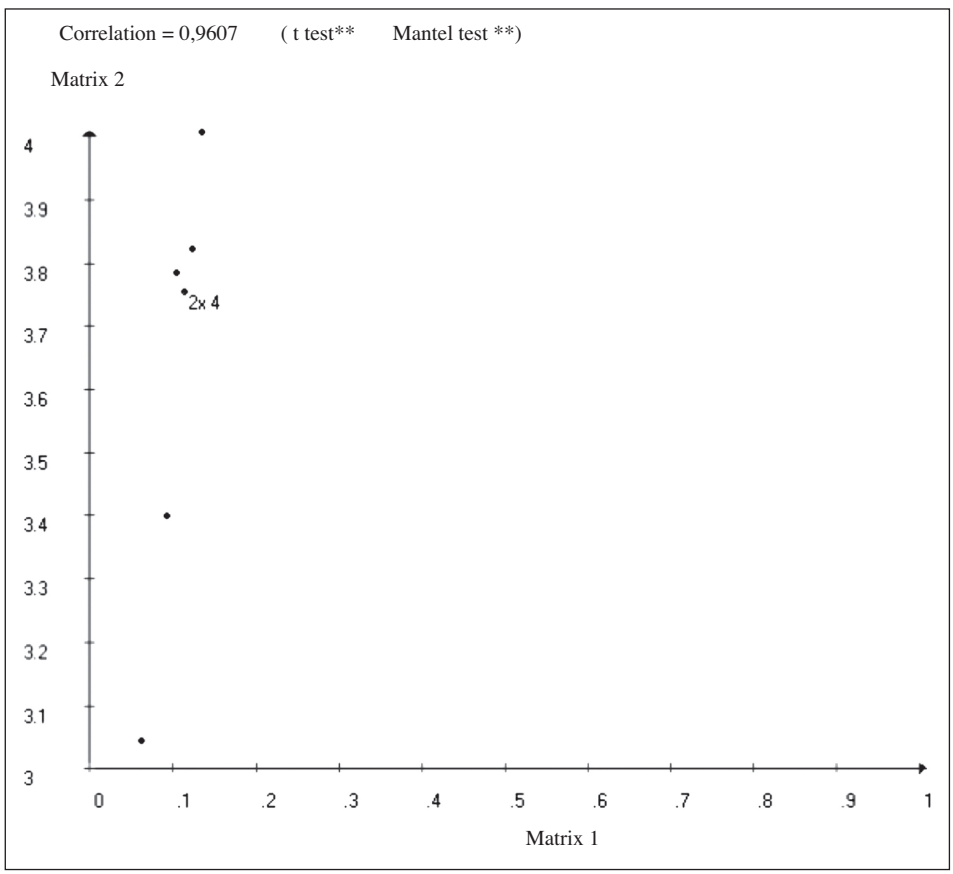

Fig. 2.—Correlation between dissimilarity matrixes for RCD n. 216 and BACME.

The interpretation tools RCD n. 216 and BACME did not show any statistical differences. In fact, both were efficient to give a good diagnosis of hygiene and sanitary conditions of the food services under analysis.

References

1. Silva DBCR, Amadei C. *Administração do serviço de nutrição e dietética*. São Paulo: Centro São Camilo de desenvolvimento em administração da saúde – CEDAS; 2001.
2. Cardoso RCV, Souza EVA, Santos PQS. Unidades de alimentação e nutrição nos campi da Universidade Federal da Bahia: um estudo sob a perspectiva do alimento seguro. *Rev Nutr.* 2005; 18(5): 669-680. doi:10.1590/S1415-52732005000500010.
3. Cruz AG, Cenci AS, Maia MCA. Pré-requisitos para implementação do sistema APPCC em uma linha de alface minimamente processada. *Ciênc Tec Aliment*. 2006; 26(1): 104-109. doi: 10.1590/S0101-20612006000100018.
4. Akutsu RC, Botelho RC, Camargo EB, Sávio, KEO, Araújo WC. Adequação das boas práticas de fabricação em serviços de alimentação. *Rev Nutr.* 2005; 18(3): 419-427. doi: 10.1590/S1415-52732005000300013.
5. Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária. Regulamento Técnico de Boas Práticas para Serviços de Alimentação. *Resolução nº 216* de 15 de setembro de 2004 [Internet]. 2004 [acesso 2012 abr 12]. Disponível em: <http://www.anvisa.gov.br/>.
6. Associação Brasileira de Empresas de Refeições Coletivas. *Manual ABERC de práticas de elaboração e serviços de refeições para coletividades*. 9ª ed. São Paulo: Editora Metha; 2009.
7. Stata Corp. 2009. *Stata Statistical Software: Release 11*. College Station, TX: Stata Corp LP.
8. IBM Corp. Released 2011. *IBM SPSS Statistics for Windows, Version 20.0*. Armonk, NY: IBM Corp.
9. Hair JF, Tatham RL, Anders on RE, Black W. *Análise multivariada de dados*. 5ª ed. Porto Alegre: Bookman; 2005.
10. Cruz, CD. *GENES* - a software package for analysis in experimental statistics and quantitative genetics. *Acta Scientiarum. Agronomy* . 2013 Jul-Sept; 35(3): 271-276.
11. Souza LC, Campos GD. Condições higiênico-sanitárias de uma dieta hospitalar. *Rev Nutr.* 2003; 16(1): 127-134. doi: 10.1590/S1415-52732003000100013.
12. Veiros MB, Proença RPC, Santos MCT, Kent--Smith L, Rocha A. Food safety practices in a portuguese canteen. *F. Control.* 2010; 20: 936-941. doi:10.1016/j.foodcont.2009.02.002.
13. Genta TMS, Maurício AA, Matioli G. Avaliação das Boas Práticas através de check-list aplicado em restaurantes self-service da região central de Maringá, Estado do Paraná Maringá. *Acta Sci. Health Sci.* 2005; 27(2): 151-156.
14. Oliveira MN, Brasil ALD, Taddei JAAC. Avaliação das condições higiênico-sanitárias de cozinhas de creches públicas e filantrópicas. *Ciênc & Saúde Colet*. 2008; 13(3):1051-1060.
15. Caturla MYR, Valero A, Carrasco E, Posada GD, Gimeno RMG, Zurera G. Evaluation of hygiene practices and microbiological status of ready-to-eat vegetable salads in Spanish school canteens. *J Sci Food Agric*. 2012; 92: 2332–2340.
16. Roto TL, Nevas M. Restaurant business operators' knowledge of food hygiene and their attitudes toward official food control affect the hygiene in their restaurants. *F. Control.* 2014; 43: 65-73.
17. Bas M. Ersun AS, Kivanç G. Implementation of HACCP and prerequisite programs in food businesses in Turkey. *F. Control.* 2006; 17: 118–126.
18. Nascimento A, Almeida RMVR, Castilho SR, Infantosi AFC. Análise de correspondência múltipla na avaliação de serviços de farmácia hospitalar no Brasil. *Cad. Saúde Pública*. 2013 jun; 29(6): 1161-1172.