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Good hygiene practices in hospital nutrition services: the view of internal and external auditors

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Abstract

The objective of this study was to evaluate the hygienic-sanitary conditions of hospital nutrition services according to internal and external auditors, before and after intervention, based on the requirements of Good Hygiene Practices. Fifteen hospital nutrition services were evaluated based on a checklist applied by internal auditors and by an external auditor. The intervention program was prepared and implemented in all the locations over one year, and was composed of four points: 1) training; 2) preparation of the action plan; 3) preparation of the documentation; 4) monthly visits to motivate the food handlers and responsible technicians, accompaniment and assistance in the implementation of Good Hygiene Practices. An improvment in the application of Good Hygiene Practices was observed in the hospital nutrition services after the systematic intervention, in the view of both the internal and external auditors, except the requirement related to operational aspects, which had a low percentage of adequacy, both before and after the intervention Before the intervention, there was a significant difference between the evaluation of the internal auditors and the external auditor, which was not found later. These results suggest that the systematic intervention assisted in the adoption of Good Hygiene Practices by hospital nutrition services, according to both the internal and external auditors, and contributed to increasing the knowledge of the internal auditors.

Keywords: foodborne diseases; food hygiene; food inspection; quality control.

Practical Application: Significant improvement in the hospital nutrition services after new form of intervention for the implementation of Good Hygiene Practices Program. Good Hygiene Practices with external professional intervention. An external professional allows impartial evaluation of nonconformities.

1 Introduction

In hospitals, the nutrition service is the department in which the activities are conducted that relate to food and nutrition, for patients, their companions and employees (Stangarlin et al., 2013a). In this environment, the food prepared should support the recovery and maintenance of people's health, and the intention should be to offer nutritionally balanced and safe meals, from a hygienic-sanitary perspective (Stangarlin et al., 2013b).

It is important to offer safe meals to these individuals; and this involves a systematic approach to the control of food contaminants, through the use of Good Hygiene Practices (Saccol et al., 2015). Good Hygiene Practices is a preventive quality program and its implementation in food establishments, such as hospital nutrition services, allows the control of hygienic-sanitary requirements in the steps of food preparation (Serafim et al., 2015).

Studies conducted in food establishments in Brazil and other countries have revealed that after the implementation of Good Hygiene Practices there was a decrease in non-conformities with hygienic-sanitary criteria and positive changes in the behavior of administrators and food handlers (Rodrigues et al., 2012; Ababio et al., 2016). Nevertheless, the implementation of the program can be harmed by the absence of technical knowledge among those who are responsible for the establishment, or by the fact that the people with technical responsibility for food handling are accustomed to the existing non-conformities in the work environment (Faour-Klingbeil et al., 2015). Therefore, intervention strategies with the assistance of outside professionals and constant visits are important for assisting in the implementation and maintenance of Good Hygiene Practices in hospital nutrition services (Stangarlin et al., 2013a; Rodrigues et al., 2012).

The current sanitary legislation also encourages the implementation of Good Hygiene Practices in food establishments. In Brazil, many laws have been enacted by the Brazilian Health Surveillance Agency (Anvisa) to establish requirements to be adopted by food services (Brasil, 2004; Rio Grande do Sul, 2009, 2010; São Paulo, 2011, 2013). In hospital nutrition services their implementation became mandatory with the publication of the Resolução de Diretoria Colegiada [The Collegiate Board of Directors] (RDC) nº 52, by Anvisa (Brasil, 2014), which expanded the scope of RDC nº 216 (Brasil, 2004), and by Portaria [Regulation] nº 1224 (Rio Grande do Sul, 2014), which expanded the application of Portaria nº 78 (Rio Grande do Sul, 2009).

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Considering the importance of care in the supply of safe meals in hospital environments and new legislation in Brazil, The purpose of this study was to evaluate the hygienic-sanitary conditions of hospital nutrition services from the perspective of internal and external auditors, before and after systematic intervention, based on the requirements of Good Hygiene Practices.

2 Materials and methods

The sample used in this study was defined by a survey of the hospitals in the central region of Rio Grande do Sul (RS), Brazil. The criteria for inclusion was to have at least one nutritionist as a technician responsible for the hospital nutrition services, and that this technician be available to participate in the study, as indicated by the signing of a Free Prior and Informed Consent.

The evaluation conducted in this study considered all the areas related to hospital nutrition services, that is, the area of reception; storage and preparation of foods; sanitizing of utensils; and cafeterias, locker rooms and bathrooms used by food handlers. The infant-formula facility and the enteral nutrition services were not considered, because they are governed by specific legislation.

2.1 Checklist

A checklist of Good Hygiene Practices was developed based on current Brazilian laws, including, RDC nº 216 (Brasil, 2004) and Portaria nº 78 (Rio Grande do Sul, 2009). The checklist considered 149 items divided into 10 requirements: buildings and physical installations (27 items); equipment, furniture and utensils (3 items); maintenance and calibration (4 items); sanitizing of the installations, equipment and utensils (17 items); water supply (9 items); integrated pest control (7 items); residue handling (3 items) handlers (15 items); operational steps (53 items) and documentation and responsibility (11 items).

The checklist was applied before and after the systematic intervention by the technicians responsible for the hospital nutrition services, who in this study are denominated as internal auditors, and by an outside professional trained in food services, who is denominated as an external or outside auditor, who evaluated all the locations using the same methodology. The evaluation by the internal and external auditors was applied concomitantly, at each hospital nutrition service, without one auditor interfering in the response of the other. The evaluations and monthly visits were planned through telephone contacts with the responsible technicians at the locations and took place during the execution of work routines.

While filling out the checklist, the items were evaluated as: Does not Apply, when the requirement did not involve activities undertaken in the hospital nutrition services; Adequate, when the location met the requirement and Inadequate, wen the requirement was not met. Later, the percentage of general compliance, and compliance for each requirement was calculated.

2.2 Systematic intervention program

The program proposed suggested a new form of intervention for the implementation of the program for Good Hygiene Practices in hospital nutrition services, combining concepts and strategies presented in other studies (Stangarlin et al., 2013a; Cunha et al., 2013). The systematic intervention was conducted for one year (March/2013 to March/2014) and consisted in four main points: 1) training, with a focus on improving the knowledge of the Good Hygiene Practices requirements; 2) preparation of the action plan, to assist the technical representatives in the planning of the non-conformities found after application of the verification list; 3) preparation of the documentation (Manual of Good Hygiene Practices and Standardized Operational Procedures), to improve the routines and work processes: 4) monthly visits at the locations to motivate the food handlers and responsible technicians, accompaniment and assistance in implementation of the Good Hygiene Practices.

A total of three training sessions were held, of 2 hours each, at the beginning, middle and end of the intervention. These training sessions took place in classrooms with at most 20 handlers and addressed the following themes: food contamination, food borne illnesses, hygienic food handling and Good Hygiene Practices.

The second point of systematic intervention, which consisted in the action plan, was prepared and planned by the internal auditors with the assistance of the outside auditor. The objective was to plan how to improve all the non-conforming items detected after the application of the checklist. The action plan consisted in the identification of the non-conformities; determination of the corrective actions; definition of those responsible for resolving the non-conformities; evaluation of the investments needed and the time for adjusting the items, which were defined by each hospital nutrition service.

The preparation of the Good Hygiene Practices documentation was part of the third point, and the Good Hygiene Practices Manual and four Standardized Operating Procedures, established by law (Brasil, 2004; Rio Grande do Sul, 2009), based on the instruments proposed by Stangarlin et al. (2013a) were prepared and implemented by the internal auditors with assistance from the outside auditor.

The fourth point included monthly visits by the outside auditor to each hospital nutrition service during the intervention. The purpose of this was to motivate the food handlers and responsible technicians, and to accompany and guide them in the implementation of the Good Hygiene Practices.

The results were evaluated with the software *Statistical Package for the Social Sciences* (SPSS), version 19.0. The data were analyzed using a simple statistical descriptive (average and percentage). A normality test of the data was conducted (Shapiro-Wilk test). Later, when comparing the average of the general suitability and of the requirements among the evaluators the "T" test was used for paired samples and were considered statistically significant when $p < 0.05$.

The ethical aspects were respected according to Resolution nº 466/2012 (Brasil, 2012), and the study was approved by the Research Ethics Committee of the Federal University at Santa Maria, under number 187.120.

3 Results and discussion

Of the universe of 26 hospitals in 20 municipalities, 19 hospital nutrition services met the criteria for inclusion. The other seven did not have a nutritionist as a responsible technician. Of the hospital nutrition services that met the criteria for inclusion, 15 were able to participate in this study, and they provided an average total of 2,700 meals per day, had a total of 308 handlers and 27 nutritionists as responsible technicians.

The absence of a nutritionist as the responsible technician in hospital nutrition services reflects the fragility that still exists in this sector in guaranteeing the care for feeding and nutrition and offering balanced and safe meals, with the perspective of professionals who, because of their education, have better knowledge about the aspects that should be applied in these locations.

The low quality of this care in hospital nutrition services can aggravate the state of health of patients, increase the risks of food contamination and raise hospital costs (Stangarlin et al., 2013a). Therefore, the nutritionist as the responsible technician has an important role in the hospital environment, contributing, by means of specific attributions, to the preservation and promotion of the health of patients, those who accompany them and employees, and in the work processes that minimize the risks and additional costs.

Table 1 demonstrates the results for the general average of the hygienic-sanitary conditions of the hospital nutrition services, in the view of the internal and external auditors, before and after the systematic intervention.

Table 1 indicates that after the systematic intervention there were significant improvements in the hospital nutrition services, in terms of compliance with Good Hygiene Practices, both in the evaluation of the internal auditors ($p = 0.0180$), and in the evaluation of the outside auditor ($p = 0.0001$). This result shows that the intervention strategy proposed was effective in accompanying, guiding and motivating those responsible for hospital nutrition services to implement the Good Hygiene Practices. It is worth emphasizing that no hospital nutrition service had implemented the Good Hygiene Practices program before the systematic intervention.

The application of Good Hygiene Practices in hospital nutrition services involves the adoption of structural, personnel and documental improvements (Saccol et al., 2012) and requires an approach that involves the entire staff, and the understanding of the requirements of the Practices and constant evaluations (Stangarlin et al., 2013b). Various indicators can be used to evaluate their effectiveness, with evaluations before and after implementation, among those most used (Cunha et al., 2014; Saccol et al., 2015).

Table 1. Hygienic-sanitary conditions of 15 hospital nutrition services in the view of internal and external auditors, before and after systematic intervention, based on Good Hygiene Practices requirements. Rio Grande do Sul, Brazil, March 2013 to March 2014.

	Internal Auditors (Avg. % AD ± SD)	External Auditors (Avg. % AD ± SD)
Before intervention	77 ± 11	55 ± 11
After intervention	86 ± 1	85 ± 1
p.	0.0180*	0.0001*

Key: %: Percentage; AD: Suitability; DP: standard deviation; p.: "t" test for independent samples ($p < 0.05$). *significant values.

Corroborating with this study, Serafim et al. (2015), reveal that to improve the results of the evaluations conducted in food establishments, such as hospital nutrition services, there has been an increasing use of strategies where the internal and outside evaluators work in conjunction to complete the evaluation.

The systematic intervention conducted in this study with the presence of an outside professional and monthly visits was extremely important in the evaluation and improvement of the Good Hygiene Practices requirements, because it helped with suggestions for improvements in physical structure, hiring sub-contracted companies for the items of pest control, water supply, equipment maintenance and calibration and in the assistance in the description of the documents and training, and also helped to have the manipulators and responsible technicians not lose their motivation.

In this sense, it was suggested that the outside interventions adopted in hospital nutrition services be consecutive and permanent, even after the implementation of the Good Hygiene Practices, so that the company routines do not interfere in the controls and necessary adjustments, which are undergoing constant alterations.

Studies conducted in food establishments also revealed significant improvements after an intervention strategy, suggesting that the companies adopt these programs in a continuous manner, because they help to motivate the work staff and thus lead to continuity in compliance with the Good Hygiene Practices (Rodrigues et al., 2012; Cunha et al., 2013; Ababio et al., 2016). Therefore, up-to-date, systematic and impartial information allows a change in behavior of individuals and identifies errors that may not be perceived during work routines, minimizing the risk of food contamination (Faour-Klingbeil et al., 2015).

The hygienic-sanitary conditions of the hospital nutrition services according to the requirements, from the perspective of the internal and external auditors, before and after the systematic intervention, is found in Table 2.

After the systematic intervention it was observed that 70% ($n = 7$) of the 10 requirements improved in the evaluation of the internal auditors and 80% ($n = 8$) in the evaluation of the outside auditor (Table 2). The requirements that increased their percentage of adoption after the intervention, in both evaluations, were the building and physical installations; sanitizing of the installations, equipment, furniture and utensils; water supply; pest control; residue management; handlers and documentation and responsibility.

Similar results were found by Cunha et al. (2013), where positive improvements in relation to the buildings and installations, integrated pest management, control of water and food handlers were also found after an intervention strategy. This is satisfactory, because these items are determinant for the implementation

Table 2. Hygienic-sanitary conditions of the 15 hospital nutrition services according to the requirements in the view of the internal and external auditors, before and after systematic intervention. Rio Grande do Sul, Brazil, March 2013 to March 2014.

Avg. percentage of compliance by requirement	Before intervention (Avg. % AD ± DP)		p.	After intervention (Avg. % AD ± DP)		p.
	AI	AE		AI	AE	
1. Building and physical installations	68 ± 16	68 ± 10	0.6627	76 ± 13	83 ± 0	0.0809
2. Equipment, furniture and utensils	83 ± 21	65 ± 19	0.0116*	79 ± 30	84 ± 20	0.7535
3. Maintenance and calibration	47 ± 37	31 ± 20	0.2407	49 ± 43	22 ±37	0.0664
4. Sanitizing of the installations, equipment, furniture and utensils	90 ± 11	60 ± 18	0.0001*	93 ± 1	92 ± 11	0.8758
5. Water supply	91 ± 16	89 ± 17	0.7200	94 ± 10	99 ± 0	0.0797
6. Integrated pest control	97 ± 1	87 ± 16	0.0411*	93 ± 22	99 ± 0	0.5238
7. Residue management	79 ± 25	70 ± 22	0.1968	98 ± 1	93 ± 1	0.0618
8. Handlers	73 ± 16	48 ± 16	0.0088*	85 ± 18	70 ± 32	0.1433
9. Operational steps	0 ± 0	0 ± 0	0.1709	0 ± 0	0 ± 0	0.1709
10. Documentation and responsibility	61 ± 27	15 ± 31	0.0006*	87 ± 18	85 ± 24	0.9461
General avg.	77 ± 11	55 ± 11	0.0002*	86 ± 1	85 ± 1	0.6471

Key: %: percentage; SD: standard deviation; p.: "t" test for independent samples ($p<0.05$); IA: internal auditors; EA: external auditors. * significant values.

of the Good Hygiene Practices and are often not adjusted in hospital nutrition services because of the high investment cost and absence of change of habits and inadequate work routines.

Note that, before and after the intervention, the requirements for water supply and integrated pest control were those that had good compliance, in the evaluation of both the internal and external auditors (Table 2). These results demonstrate that hospital administrators are committed to the current sanitary legislation, because these requirements are their responsibility.

The compliance with the requirements concerning water supply and integrated pest control in hospital nutrition services can also be linked to higher standards for these requirements by inspection agencies in hospital inspection visits. This constant inspection and the requirements for some procedures made by sanitary authorities makes these items a priority and compliance with them essential.

According to Nevas et al. (2013), the control of official inspectors is considered valuable, considering that 78.8% of those interviewed report that the actions taken based on inspections improve the hygienic-sanitary conditions of foods. In this study, a positive correlation was also found between the more frequent visits by official inspectors with the removal of the non-conformities. This corroborates with what was found by other authors (Soto et al., 2009; Stangarlin et al., 2013b; Winter et al., 2015), who report that the improvements in the requirements evaluated with greater rigor by the inspection agencies will only be effective and maintained if actions are conducted with their continuous programmed and periodic inspections.

It is also believed that the most exacting inspections can also contribute to compliance with other requirements, mainly those that require greater investments, such as those related to the physical structure of hospital nutritional services.

The lack of compliance with requirements concerning the building and physical installations can be decisive in the failure to implement Good Hygiene Practices. Martins & Rocha (2014) indicate that an incorrect layout of establishments, as well as a lack of equipment, are some of the greatest obstacles from the perspective of buildings. Therefore, healthcare services managers must have the financial resources needed to realize the necessary improvements (Saccol et al., 2012). Another aspect that should be considered is the difficulty in complying with requirements related to food handlers, because not all the items have high costs, but the results, which often require a long-term project to be achieved, can discourage the staff and technician responsible for hospital nutrition services.

For the implementation of Good Hygiene Practices, the requirements of the current sanitary legislation (Brasil, 2004; Rio Grande do Sul, 2009) related to hospital nutrition services must be in conformity. However, if there are many non-complying items, it is suggested that priority be given to improvements in those items considered to create the greatest sanitary risk. In this sense, it is recommended to improve, first, the items related to use of potable water; time and temperature of foods; prevention of crossed contamination; the criteria related to raw materials and the ingredients used; cleanliness of food contact surfaces and personal hygiene of staff, because they can directly interfere in the safety of foods and thus place at risk the health of patients, those who accompany them and employees (Food and Drug Administration, 2009; Cunha et al., 2014).

Nevertheless, some of these criteria did not attain positive results in this study, as demonstrated in Table 2. The requisites for operational steps, which encompasses the items considered of greater sanitary risk were those that had a lower percentage of compliance in the evaluation of the internal and external auditors, both before (internal auditor: 0 ± 0; external auditor: 0 ± 0) and after (internal auditor: 0 ± 0; external auditor: 0 ± 0) the intervention.

In relation to the operational steps, it was found that hospital nutrition services have difficulty in compliance with the following items: selection of suppliers, reception, defrosting, cooking and distribution of foods.

It was found that, in terms of criteria for selecting suppliers, raw materials and ingredients, most of the Hospital Nutrition Services do not have specific criteria for the raw materials and ingredients used, do not inspect the raw materials, and do not have temperature control of the perishable foods at reception. This situation can be related to the fact that most of the hospitals evaluated are philanthropic institutions, maintained by donations, which often leads to the absence of application of food safety criteria, focusing only on providing the food.

Nevertheless, the provision of foods for the hospital sector is of extreme importance and requires high quality standards, including the compliance with hygienic-sanitary norms (Schneider, 2006). According to the author, the absence of control in this phase of the process compromises the health and quality of life of those who receive hospital food, and the harm is often not immediately revealed, although it can have an accumulative effect and can appear after a hospital stay.

In relation to the criteria for defrosting, most of the locations conduct this procedure at room temperature or at an improper temperature, due to the absence of refrigeration equipment at a sufficient quantity or at a correct temperature. At cooking, there is no temperature control, which does not guarantee the effectiveness of the thermal treatment; and there is no temperature control of foods during the distribution phase, which can compromise both the hygienic-sanitary quality of the foods as well as the satisfaction of the patients, because the improper temperature of the meals is considered one of the main causes of complaints of the hospitalized patients, as demonstrated in various studies (Johns et al., 2010; Sousa et al., 2011; Ferreira et al., 2013; Fernández-Martínez et al., 2013).

These results can be related to the difficulty faced by the responsible technicians and food handlers to conduct changes in work routines, given that these items depend exclusively on their interventions and attitudes, and also reveal the need for focused actions and strategies in the operational steps to guarantee the safety of food produced in the hospital environment.

According to Läikkö-Roto et al. (2016), countless barriers can contribute to the absence of compliance with hygienic-sanitary requirements at food handling locations, highlighted by the lack of attitude, commitment and time of administrators for supervision of the criteria related to food safety; insufficient education of the food handlers; and the absence of proper investments.

Table 2 shows that before the intervention, there was a significant difference ($p = 0.0002$) in the general average between the evaluations of the internal and external auditors, but this difference was not found later ($p = 0.6471$). It was also found that before the intervention, 50% ($n = 5$) of the requirements had a statistically significant difference ($p < 0.05$) in the evaluation between the auditors, given that the outside auditor was more exacting than the internal auditors. After the intervention, there was no significant difference between them ($p < 0.05$) in any of the requirements evaluated, and the internal auditors were more critical than the outside auditor in 40% ($n = 4$) of the requirements including: buildings and physical installations; equipment, furniture and utensils; integrated pest control and water supply. This demonstrates that the systematic intervention assisted in the knowledge of the internal auditors, providing a more critical vision in relation to the requirements needed for the implementation of the Good Hygiene Practices in hospital nutrition services and improved the standardization of the evaluations, decreasing the differences between the evaluators.

A study conducted in hospital nutrition services in Brazil found differences between the evaluation of the responsible technicians and outside professionals, with the outside professional more critical in his evaluation than the responsible technicians (Stangarlin et al., 2013b). Park et al. (2010), also found that the individuals that evaluated their workplace had a different view of the procedures conducted. This demonstrates that some of those responsible are not sufficiently critical, or do not have the knowledge needed to conduct suitable evaluations of the hygienic-sanitary conditions at their companies, which can place the health of eaters at risk.

The difference between internal and outside evaluators can be associated to the work routine, which influences the perception of the non-conformities. This difference was also found by Faour-Klingbeil et al. (2015), who attributes this result to the fact that the managers become accustomed with the errors, and to a lack of knowledge by the responsible technicians. A true understanding of the requirements needed for the implementation of Good Hygiene Practices by those responsible for hospital nutrition services and of the expectations and limitations of this program are determinants in the success of its implementation.

A study by Läikkö-Roto & Nevas (2014), observed a positive correlation between knowledge of and actions related to Good Hygiene Practices. For this reason, technicians responsible in food establishments, such as hospital nutrition services should improve their knowledge about hygienic-sanitary requirements to be able to conduct more critical and complete analyses, effectively guaranteeing the production of safe food (Serafim et al., 2015). An evaluation by a person outside the company may also be necessary, because they make impartial comments and identify errors that may not be perceived due to work routines.

4 Conclusions

Based on the results of this study, it was concluded that the systematic intervention, based on the requirements of Good Hygiene Practices, helped improve hygienic-sanitary conditions in hospital nutrition services, in the view of both the internal and external auditors. This reinforces the importance of the use of strategies, with the assistance of an outside professional who makes impartial evaluations, as well as regular visits that can assist the control and safety of food.

The systematic intervention proposed efficiently improved the requirements related to buildings and physical installations; sanitizing of the installations, equipment, furniture and utensils; water supply; pest control; residue handling; handlers and documentation and responsibility, according to both evaluators.

Although systematic intervention has contributed to better knowledge among internal auditors and provided them a more critical view of the legal requirements, and has decreased differences in evaluations between the evaluators, new studies

must be conducted to assist the responsible technicians and food handlers to attain compliance with criteria for procedures that present high risk and impact for food safety.

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