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Knowledge, attitudes and practices of food handlers in food services

Nível de conhecimento, atitudes e práticas dos manipuladores de alimentos em serviços de alimentação

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Abstract

Aim: Assessing the level of knowledge, attitudes and practices of food handlers working in food services. *Materials and Methods*: Cross-sectional study conducted with food handlers from 15 food services: 75 individuals, in total. A questionnaire containing sociodemographic, as well as knowledge, attitudes and practices (KAP) evaluation questions was applied. The self-administered questionnaire comprised 30 questions about good food-handling practices. Scores equal to or higher than 70% were considered adequate to evaluate each block and the questionnaire as a whole. Data were analyzed in the SPSS software version 22. *Results and Discussion*: 64% of the herein evaluated food handlers performed commercial restaurant activities, 84% were women, and 52% had high school education. With respect to the KAP questions, the knowledge and attitude blocks recorded lower scores than the practice block. The mean score in the questionnaire was 54.9 ± 4.18. Failures in the understanding and knowledge about food handling may lead to lower awareness about proper handling procedures and result in false ideas about food safety. *Conclusion*: Food handlers presented food handling-knowledge deficiencies; therefore, it is necessary training them so they can aggregate information to improve their performance.

Keywords: Good Manufacturing Practices. Food Service. Food quality. Food handling. Quality control.

Resumo

Objetivo: Avaliar o nível de conhecimento, atitudes e práticas de manipuladores de alimentos de serviços de alimentação. *Materiais e Métodos:* Trata-se de estudo transversal feito com manipuladores de alimentos de 15 serviços de alimentação, sendo que participaram da pesquisa 75 indivíduos. Foi aplicado um questionário contendo questões sociodemográficas e para avaliação do conhecimento, atitudes e práticas (CAP). O questionário autoaplicável continha 30 questões relacionadas às boas práticas na manipulação dos alimentos. Foi considerada adequada a nota igual ou superior a 70 % para a avaliação de cada bloco e do questionário por completo. Os dados foram analisados com auxílio do *software* SPSS, versão 22. *Resultados e Discussão:* 64% dos manipuladores exerciam atividades em restaurantes comerciais e 84% eram do sexo feminino. Quanto ao nível de escolaridade, 52% dos manipuladores tinham o ensino médio completo. Quanto às questões sobre CAP, no bloco de conhecimento e atitudes foram observadas menores pontuações quando comparado ao bloco de práticas. A média de pontuação no questionário foi igual a 54,9 ± 4,18. Falhas quanto ao entedimento e conhecimento sobre cuidados com os alimentos podem diminuir o nível de consciência sobre manipulação adequada e culminar em uma falsa ideia de segurança. *Conclusão:* Os manipuladores apresentaram falhas na avaliação do conhecimento; ressalta-se, assim, a necessidade de treinamento, de modo a agregar informações para promover melhorias de desempenho nas atividades executadas.

Palavra-chave: Boas Práticas de Fabricação. Serviços de alimentação. Qualidade dos alimentos. Manipulação de alimentos. Controle de qualidade.

Introduction

Many countries have experienced changes in their socioeconomic status over the last few decades. Such changes have partly led to significant growth in the popularity of food prepared away from home.[1,2]

The consumption of meals away from home has considerably increased and became the habit of many people, fact that enabled the expansion of food services such as Food and Nutrition Units (FNUs). These units are focused on providing healthy meals to specific populations such as company, school and philanthropic institution employees, whereas Meal-Production Units (MPUs) comprise commercial restaurants, bakeries and snack bars, among others. The food industrygrowth

and valuation led to increased competitiveness and raised consumers' concern about the sanitary and nutritional quality of the food. Thus, commercial establishments must focus on continuously improving the quality of the services they provide.[3-8]

Controlling the hygienic-sanitary conditions in places where food is handled is a critical point, since distinct contamination sources may be introduced at different food preparation stages. Food borne diseases (FBD) are associated with pathogenic microorganisms found in the food. Consequently, they are one of the main consequences of lack of hygienic-sanitary control in the food industry, where biological, physical and chemical hazards can be found.[9]

Thus, the increased number of meals provided to consumers generates strong concern about strategies focused on assuring the quality of the food. It is essential improving sanitary control actions to be applied by the food industry in order to help controlling and minimizing risks deriving from the intake of contaminated food.[10] According to the Ministry of Health, 498 FBD cases were reported in 2010, whereas 795 cases were reported in 2011 (297 additional cases) and 2012.[11]

Inappropriate food handling is pointed out as the main cause of outbreaks involving contaminated food. Outbreaks have been constantly reported in several food services such as restaurants.[12-14] Accordingly, food handlers are of crucial importance because they can facilitate, and even spread, deteriorating and/or pathogenic microorganisms in their work environment at different food production stages.[15,16]

Studies conducted in different Brazilian states showed that food handlers are not fully prepared, fact that directly associates them with food contamination resulting from diseases, poor hygiene habits and from inappropriate practices adopted in production processes.[17] Food handlers are the main responsible for contamination events during the food handling process, mainly due to lack of guidelines and training. It is necessary improving the quality of products and services, as well as to enable food handlers to develop adequate hygienic-sanitary habits to be applied on a daily basis.[12]

It is essential evaluating knowledge, attitudes and practices to help better planning the training to be applied to food handlers.[18]

In light of the foregoing, the aim of the current study was to assess the level of knowledge, attitudes and practices of food handlers working in food services.

Materials and methods

The current research is a cross-sectional study whose data were collected through convenience sampling in commercial restaurants and in a food and nutrition unit located in Vitória-ES, from July to October 2015. A letter of invitation presenting the research objectives was sent to the commercial establishments; subsequently, the letter of consent to participate in the research was

requested. Food handlers who agreed to participate in the study signed the Free and Informed Consent Form (ICF). The research was approved by a research ethics committee under protocol n. 41393714.5.0000.5060.

The assessment of knowledge, attitudes and practices

A self-administered structured questionnaire was developed to help assessing the knowledge, attitudes and practices (KAP) of food handlers by taking into consideration that all research participants were literate, based on similar studies.[19-22] The content of the questions was based on the current legislation on good food-handling practices (RDC 216/2004).[23]

The questionnaire application days and times were defined according to the availability of the commercial establishment, in the majority of the occasions realized in the afternoon, after the end of the food handlers' working shift. The questionnaires were distributed and completed without anyone's interference; the application time for each participant was 20 minutes, on average.

The aim of the first part of the questionnaire was to evaluate food handlers' knowledge about food safety. Questions related to daily food-handling practices were presented and addressed issues such as personal and food hygiene, cross contamination, temperature control, food thawing and environmental hygiene. One out of three possible answers - "yes", "no" and "I do not know" - was presented.The order of "yes" and "no" as correct answers was randomized and did not follow any pattern. One point was attributed to each correct answer, whereas each incorrect or "I do not know" answer scored zero. The knowledge score range was set between 0 and 10.[22]

The last part of the questionnaire assessed the self-reported practices of food handlers. Ten questions about daily practices, which included issues such as personal and food hygiene, cross-contamination, temperature control, food thawing and environmental hygiene, were included in the questionnaire. This part of the questionnaire adopted a five-point scale, which ranged as follows: 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Many times, and 5 = Always. Practices received scores ranging from 0 to 50.[22]

Scores equal to or higher than 70% were considered appropriate to evaluate each block and the questionnaire as a whole.

Data analysis

Data were stored in Microsoft Excel spreadsheets and analyzed in the SPSS software, version 22. The Kolmogorov-Smirnov test was used to evaluate data distribution normality. Data did not present normal distribution; consequently, the results of the knowledge, attitudes and practices

evaluation were analyzed through Spearman's correlation test; p!0.05. Descriptive statistics used mean, standard deviation and percentage values for data referring to sociodemographic scores and features. Pearson's chi-square association test (X^2) was also applied to evaluate the possible relation between sociodemographic features and food handlers' level of knowledge, attitudes and practices.

Results and discussion

Twenty-seven (27) commercial establishments - 25 restaurants and 2 FNUs - were contacted. Among them, 14 commercial restaurants and 1 FNU agreed to participate in the research. Seventy-five (75) out of 142 invited food handlers agreed to participate. Table 1 shows the sociodemographic variables of the herein evaluated food handlers.

Table 1. Sociodemographic features of food handlers working in commercial restaurants and in FNUs in Vitória-ES, 2015.

VARIABLE	N	%
Sex		
Women	63	84.0
Men		
Age (years)		
< 39	50	66.4
40 - 49	13	17.3
> 50	12	16.0
Schooling		
Up to complete primary education	32	42.7
Up to complete high school	39	52.0
Up to complete higher education	4	5.3
Previous experience in the field		
Yes	68	90.7
No	7	9.3
Training		
Never	20	26.7
Once	25	33.3
More than once	30	40.0
Working place		
Restaurant	48	64.0
FNU	27	36.0

Most participants (n = 48) performed commercial restaurant activities and were women (84.0%), similar to the study by Da Cunha et al.[22] and Tan et al.,[24] who also recorded larger number of women among participants. According to Ferreira et al.,[25] activities related to food care and nutrition are characterized as female labor; consequently, women take these jobs in the labor market. In addition, women are more easily assigned to this type of function due to its similarity to household tasks such as cooking.[22]

The most representative schooling level was "up to complete high school" (52%); similar result was also observed in the study by Devides et al.[26], in which 55% of the food handlers reported having high school diploma. There is direct relation between food handlers' educational level and the adoption of good practices. Thus, having access to such information becomes essential to help planning the training courses.[26,27]

Twenty-six point seven percent (26.7%) of food handlers reported to have never participated in training courses. Similar result was observed by Da Cunha et al.,[22] who recorded that 31.7% of the participants did not have any type of training. Therefore, it is worth mentioning that food handlers' training can be understood as a previously planned learning strategy aimed at increasing their knowledge about the activities they perform, besides being understood as permanent changes in practices and attitudes.[28]

Training is a legal requirement in the food production environment.[23] In addition, it is essential providing continuous training to food handlers because, although the food sector often hires inexperienced professionals,[20,29] 68% of the participants in the present study reported having experience in this job position.

Table 2 shows the mean score in each question block and in the questionnaire as a whole. Food handlers showed lower scores in the knowledge evaluation. This result may raise questions about the attitudes reported by the interviewees, since the "attitudes" block recorded the highest scores. Food handlers claimed to have attitudes that helped producing safe food, but they provided incorrect answers to questions directly related to food quality control. Da Cunha et al.[22] recorded lower knowledge (5.4 ± 1.8) and practice (36.0 ± 3.6)scores; however, attitude scores were higher (9.0 ± 1.1).

The low correlation between knowledge and attitude scores (table 3) indicates that the level of food handlers' knowledge about food safety may influence food handling attitudes. In other words, low knowledge level leads to inappropriate attitudes. Attitude is the psychological trend to agree or disagree about certain facts/topics.Practice means performing a particular activity or method on a customary or regular basis.[28] According to Clayton et al.,[29] food service employees with good food safety knowledge do not always have appropriate attitudes and/or put this knowledge in practice.

Table 2. Scores recorded in the knowledge, attitudes and practices evaluation applied to food handlers working in food services in Vitória-ES, 2015.

Variable	Mean ± Standard Deviation	Minimum and Maximum Interval
Knowledge	6.7 ± 1.45	4 - 10
Attitudes	8.1 ± 1.23	4 - 10
Practices	40.6 ± 3.2	34 - 48
Questionnaire	54.9 ± 4.18	47 - 64

Table 3. Correlation between scores recorded for variables such as knowledge, attitude and practice evaluated in food handlers working in food services in Vitória-ES, 2015.

	Knowledge	*p*	Attitude	*p*	Practice	*p*
Knowledge						
Attitude	**0.280***	0.015				
Practice	0.178	0.127	0.053	0.653		

*A correlação é significativa no nível 0,05.

Only 32 food handlers recorded appropriate scores (Figure 1) in the evaluation of the questionnaire as a whole. The food safety knowledge block presented the lowest appropriate score index (n = 38) in comparison to the other evaluation blocks. The practice evaluation block was the one presenting the best performance by food handlers (n = 74). According to Soares et al.,[30] self-reported practices tend to be overstated by respondents, i.e., they say what is expected rather than what they really do on a daily basis in the meal-production environment.

The questions presenting the highest wrong-answer rate concerned hand hygiene (93.3%), disease transmission through water (64%) and food thawing (56%). Da Cunha et al.[22] also recorded high wrong-answer rate in the hand hygiene-related question (81%). According to RDC 216,[23]washstands must have antiseptic odorless liquid soap, or odorless liquid soap and antiseptic product, in order to enable adequate hand-hygiene practices.

The question about the risk of reheating food presented high correct-answer rate (77.3%). Similar result was observed by Soares et al.,[31] who found that food handlers are aware of the risk of reheating food (93.4%).

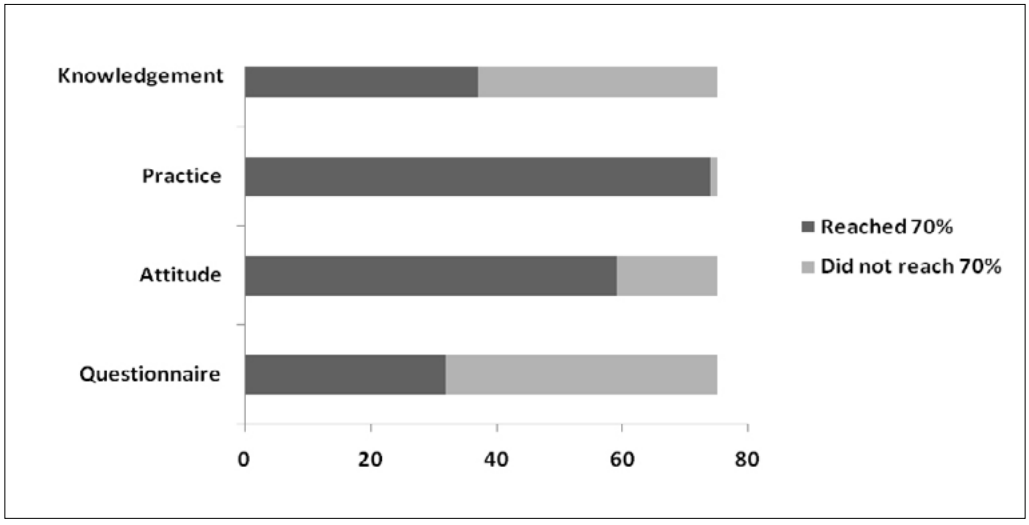

Figure 1. Distribution of food handlers according to the appropriate score recorded in the questionnaire evaluation. Vitória-ES, 2015.

The questions presenting the highest correct-answer rate concerned the public at risk of having food poisoning (84%) and food contamination risks due to diseases affecting food handlers such as diarrhea, influenza and sore throat (89.3%). Failures in the understanding and knowledge about food handling may lead to lower awareness of proper handling procedures, and it may result in false ideas about food safety.[21]

In addition to knowledge, attitude is also a crucial factor capable of influencing food-safety behaviors and practices.[21] Seventy percent (70%; n = 7) of the total questions in the "attitudes" block presented more than 90% positive answers. Similar result was recorded by other authors,[22,19] who observed more than 90% positive answersin nine out of ten questions.

The questions presenting the highest positive-answer rate in the "attitudes" block concerned hand hygiene after using the toilet and handling the garbage (98.7%), the monitoring of product validity and integrity (98.7%) and the importance of learning about safe food-handling (97.3%).

Bas et al.,[32] recorded different results in the question concerning hand hygiene; only 21.2% of the food handlers participating in their study reported the need of washing their hands after using the toilet and handling raw food, as well as before handling ready-to-eat foods. It is essential adopting correct hand-hygiene practices, since food handlers may become pathogenic microorganism sources due to failures in personal hygiene and to cross-contamination events.[32]

The question concerning the risk of having food poisoning due to food preparation in advance and to inadequate food storage recorded high negative- answer rate (45.3%). According to RDC 216/2004, the prepared-food storage and transport, from its distribution to its delivery for consumption purposes, must take place under time and temperature conditions that do not affect its hygienic-sanitary quality.[23]

Another question presenting high negative-answer rate concerned having hand injuries, bruises or lesions, and handling food (29.3%). According to Ferreira et al.,[25] 95.4% and 88.6% of the food handlers provided positive answers to questions about the importance of workers' health and the withdrawal from work activities due to illness, as well as about the requirement to go through periodic medical examinations to assess their health status, respectively. The RDC 216/2004[23] advocates that food handlers should be removed from work when they get sick and emphasizes that pre-employment and periodic medical examinations are imperative in hiring processes. Monitoring workers' health status is paramount to prevent food contamination.[23,25]

The most often recorded positive practices concerned personal hygiene (98.7%), hygiene applied to uniforms (93.3%) and keeping the hair completely covered during the work shift (90.7%). According to Veiga et al.,[33] personal hygiene affects food hygiene, as well as food quality and safety.

With respect to the most evidenced negative practices, 50.7% of the participants reported thawing food at room temperature. Improper thawing procedures favor microbial multiplication in the food and may lead to food toxinfections. Da Cunha et al.,[22] recorded similar result concerning the most inadequate practice mentioned by food handlers; 34.6% of them reported thawing food at room temperature.

In addition, 14.7% of the food handlers reported going to work when they have diarrhea, as well as other diseases, or when they have cuts and wounds on their hands. This result may indicate that food handlers are unaware of the risks of handling food when they are sick, besides indicating the fear of withdrawing from work and having potential wage losses.

Conclusion

The lack of knowledge about good food-handling practices leads to deficient attitudes, since basic information such as hand hygiene, waterborne disease transmission and food thawing recorded the highest wrong-answer rates in the present study. Practices presented high correct-answer rate and were considered satisfactory. It is worth emphasizing that the initial food handlers' acceptance in participating in the study, as well as the fact that the questionnaire was self-applied, may have influenced the large number of correct answers. In other words, food handlers provided the expected answers rather than reporting what they really do on a daily basis. Thus, it is possible assuming that the KAP evaluation, although limited to answers given by food handlers, may be the first step to help understanding their behavior.

Further studies should be carried out by taking into consideration the possible influence of psychosocial factors and of professional experience on food handlers' behavior in the food production routine.

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Contributors

Pagotto HZ and LG Espíndula participated in the elaboration, data collection and interpretation, and in the writing of the current article. Vitória AG and Machado MCMM participated in data interpretation, in the writing of the initial article and in its final version. São José JFB participated in all stages of the current study, namely: in its elaboration, guidelines, and in the revision of the final version.

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