



FACULDADE DE CIÊNCIAS DA NUTRIÇÃO E ALIMENTAÇÃO
UNIVERSIDADE DO PORTO

**Impact of a food allergy educational training to improve food allergy
knowledge and management in the food services staff of the
University of Porto**

Impacto de um programa educacional na melhoria dos conhecimentos e gestão
da alergia alimentar em colaboradores dos Serviços de Alimentação da
Universidade do Porto

Gabriela Ferreira Tavares

Orientado por: Prof.^a Doutora Renata Barros

Coorientado por: Dr.^a Susana Ribeiro e Prof.^a Doutora Cláudia Afonso

Trabalho de Investigação

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Abstract

Introduction: Once the only form of treatment of Food Allergy is dietary avoidance, dining out is a challenge for allergic individuals and catering professionals. Thus, it is necessary to evaluate the knowledge of catering staff about food allergy so that one can perceive the requirement of implementing measures, including training, to promote the staff's qualification in this area.

Aim: To evaluate the impact of an educational training in food allergy knowledge in workers from food services of University of Porto.

Methods: A training on food allergy was developed for food services staff from the University of Porto, which included food allergy definitions; epidemiology; signs and symptoms; prevention, diagnosis and treatment; dietary avoidance; cross-contact prevention; procedures in case of an emergency; legal framework and good work-practices. A food allergy knowledge questionnaire, developed by the *FAC Program* was administered before and after training. It included the evaluation of knowledge, practices, attitudes and perceptions towards food allergy in food handlers.

Results: The study included a total of 64 participants, which 84.4% were female, and 15.6% were male. The mean age was 50.0 (10.1) years-old and most of the participants only completed the 9th grade of schooling. The final mean (SD) score on the knowledge survey was significantly higher than the baseline, after food allergy training of the University of Porto' food services professionals [63.8 (16.6) % vs. 54.6 (13.1) %; $p < 0.001$].

Conclusion: Food allergy training showed to be a good strategy to improve the knowledge of catering professionals at universities' food services.

Keywords: Food Allergy, Food services, Community, Training, University

Resumo

Introdução: Uma vez que a única forma de tratamento da Alergia Alimentar é a evicção alimentar, fazer refeições fora de casa é um desafio para os indivíduos alérgicos e para o setor da restauração. Assim, é necessário avaliar os conhecimentos de alergia alimentar de trabalhadores da restauração, para perceber a necessidade de implementar medidas, incluindo a formação, que os capacitem nesta área.

Objetivo: Avaliar o impacto da formação na aquisição de conhecimentos de alergia alimentar, em trabalhadores de unidades de alimentação da Universidade do Porto.

Metodologia: Foi desenvolvida uma ação de formação para os colaboradores de unidades de alimentação da Universidade do Porto, que incluiu definições de alergia alimentar; epidemiologia; sinais e sintomas; prevenção, diagnóstico e tratamento; evicção alimentar; prevenção de contaminação cruzada; procedimentos em caso de emergência; enquadramento legal e boas práticas de trabalho. Um questionário desenvolvido no âmbito do *FAC Program* foi aplicado antes e após a formação, avaliando conhecimentos, práticas, atitudes e perceções face à alergia alimentar.

Resultados: O estudo incluiu um total de 64 participantes, 15,6% do sexo masculino e 84,4% do sexo feminino e a idade média foi de 50,0 (10,1). A maioria dos participantes apenas completou o 9º ano de escolaridade. A média (DP) dos resultados após a formação foi significativamente superior à dos resultados iniciais [63,8 (16,6) % vs. 54,6 (13,1) %; $p < 0,001$].

Conclusão: A formação em alergia alimentar, revelou-se um método eficaz para a melhoria dos conhecimentos dos colaboradores de unidades de alimentação em universidades.

Palavras-chave: Alergia alimentar, Restauração, Comunidade, Formação, Universidade

Abbreviations

FA- Food Allergy

FH- Food Handlers

HACCP- *Hazard Analysis and Critical Control Points*

SASUP – University of Porto Social Services

UP- University of Porto

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1. Introduction

Food Allergy (FA) is defined as an adverse reaction due to a specific response of the immune system, mediated by specific immunoglobulins E (IgE), that occurs in a reproducible way after the exposure to a particular food ⁽¹⁾. The foods responsible for 90% of the allergic reactions are milk, egg, fish, shellfish, wheat, tree nuts, peanuts and soy and seeds ⁽²⁾.

Concerning that FA is untreatable, the only way to prevent the occurrence of reactions is to avoid food and other products that may contain the culprit allergen(s) ⁽³⁾ and provide education for substitutional foods via professional advising.

Symptoms may include hives, abdominal pain, discomfort, vomiting, and diarrhoea. However, in some cases, anaphylaxis may occur, which can be fatal ⁽⁴⁾.

Anaphylaxis is defined as a “severe, life-threatening generalized or systemic hypersensitivity reaction”, which occurs rapidly and causes sequels in the circulatory and respiratory systems. It is estimated that 0.3% of the European population has already had an anaphylactic reaction, at least once in their lifetime. The allergic individual’ and his/her family’ quality of life may be hardened ⁽⁵⁾, since anaphylactic reactions can occur at home or in a wide variety of public places, such as sports fields, gymnasiums, schools and restaurants ⁽⁶⁾.

Since the FA prevalence is increasing ⁽⁷⁾, the catering sector has a key role in controlling this problem and setting strategies to provide a safe environment for people with FA. The avoidance of allergenic foods by allergic individuals is dependent on food safety control, throughout the food production chain, which begins in the production phase and extends to consumption, through catering and retail services ⁽⁸⁾.

Due to the risk of cross-contamination and the addition of unexpected ingredients, food services (including restaurants, bakeries, take-away establishments, fast-food restaurants, among others) are some hazards for people with FA ⁽⁶⁾. Trusting in the food industry, labelling and food handling is essential to manage their chronic condition. When an allergic patient or client enters a catering establishment, the food service worker must be able to employ a range of precautionary steps to reduce risks, since the preparation of the meal to its service to the allergic individual. These include talking with the customer, using ingredients without the culprit allergen(s) and prepare a safe meal using properly sanitized service ware ⁽⁸⁾.

Some studies carried out in different establishments and different geographic areas showed that there are evident gaps in food handlers (FH)' knowledge in FA, which hampers the service of a safe meal ⁽⁸⁻¹¹⁾.

Cooperation and communication between the allergic individual and the food industry is crucial for conscious and personalized dietary avoidance. The allergic consumer should be able to understand food allergens' information on non-packaged food and on the labelling of packaged food, as well as FH should be capable to inform the consumer correctly ⁽³⁾. In addition to the efficient communication with the consumer, FH should rigorously separate and store the ingredients complying with hygiene principles and review their labels ⁽⁸⁾.

Following the implementation of the Regulation (EU) N° 1169/2011, on the provision of food information to consumers, it is mandatory by law to guarantee that the consumer is informed of all the ingredients, processing aids and other substances that may cause FA or intolerance. This applies to "Where foods are offered for sale to the final consumer or to mass caterers without pre-packaging, or where foods are packed on the sales premises at the consumer's request or prepacked for direct

sale”^(6, 12). Therefore, not only food labelling must inform the consumers, but the food services’ workers themselves must know how to properly and accurately inform them about what allergenic food substances the meal served may or may not contain.

It is important that universities’ food services staff know how to avoid accidental exposure and life-threatening situations for consumers with FA, since most of anaphylactic reactions occur in adolescents and young adults⁽⁶⁾. Herewith, it is necessary to consider training in FA as a strategy that qualifies FH to produce and serve safe meals for allergic individuals.

Few studies have been conducted to better understand the knowledge and practices in FA of FH in universities’ foodservices^(11, 13), as well as to evaluate the impact of training in this particular theme.

2. Aim

The aim of this study was to evaluate the effectiveness of a FA educational training on FA knowledge, attitudes and practices in the food services staff of the University of Porto (UP), before and after training.

3. Methods

3.1. Participants

The study included a total of 64 participants, from a population of 92 catering professionals from University of Porto Social Services (SASUP)’ food services. The 28 catering professionals who didn’t participate were on holiday or on sick leave. They were selected from the establishments where they perform functions for the training

session, which was carried out between May and June of 2018 at SASUP's headquarters.

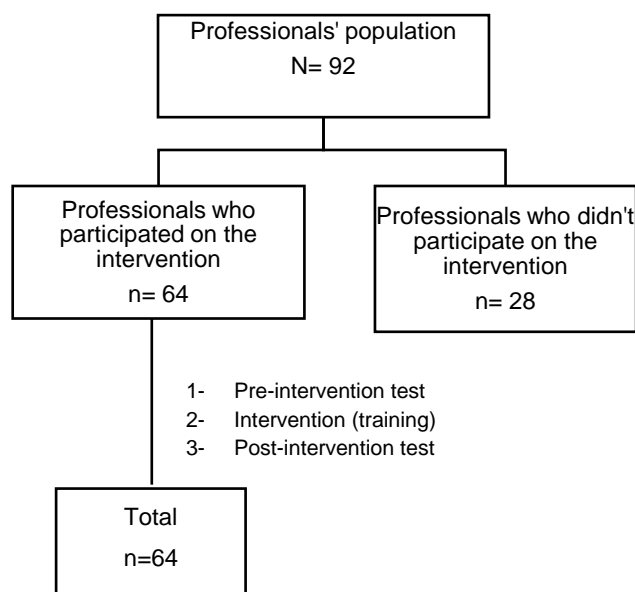


Figure I- Sample's selection from a population of 92 SASUP's food services professionals.

3.2. Ethics

The study was authorized by the Ethics Committee of the UP.

The participants were authorized to participate by the SASUP's Food Services' administration and the SASUP's director. Before completing the questionnaires, the participants were asked to read and fill an informed consent statement to participate in the study.

3.3. Food Allergy training

The training session consisted on a 2-hour lecture, with digital support in *Microsoft Office PowerPoint®*, held in a meeting room at SASUP's headquarters. The purpose was to alert the participants about FA, the risks associated and providing them information in this area.

The subjects covered in the training session included FA definitions; epidemiology; signs and symptoms; prevention, diagnose and treatment; dietary avoidance, cross-

contact prevention; procedures in case of an emergency; legal framework and good work-practices in all stages of meal production and service. It was finished with some practical exercises, related to cross-contact prevention, labelling and good work-practices.

The subjects covered based on FA Portuguese guidelines published by Directorate-General of Health ⁽¹⁴⁾.

3.4. Food Allergy Knowledge Survey

The questionnaire used was developed by the *FAC Program (Food Allergy Community Program)* ⁽¹⁵⁾ (Attachment A), and was directly administered to the participants, with the investigator supervision, due to the expected low education level of the participants. Since one of the participants was illiterate, the questionnaire was indirectly administered.

The questionnaire included questions about the participants' sociodemographic characteristics (gender, locality, educational background, job); and questions regarding their previous experience in catering, and if that was the first time they were getting training in FA.

The *Food Allergy Knowledge Survey* included 20 multiple-choice questions with single-best-answer. The questions addressed in the following themes: epidemiology; diagnosis, symptoms and treatment; dietary avoidance; emergency procedures; food labelling; legal framework, cross-contact prevention and good practices at workplace. The knowledge evaluation was made by giving each correct answer 1 point, and each wrong or "Don't know" answer 0 points. Subsequently, the questionnaire scores were converted to a 100-point scale and the mean and standard deviation were calculated. To assess knowledge improvement, the

participants answered the questionnaires immediately before and after the training session.

3.5. Food Allergy Perceptions Survey

Together with the knowledge survey, the participants filled out a questionnaire with 10 items related to FA attitudes and their perceptions on the university' food services, according to their degree of agreement. The answering options were "Strongly agree", "Agree", "Neutral", "Disagree", "Strongly disagree", which were converted to a scale from 1 to 5 ("Strongly agree"- 5, "Agree"- 4, "Neutral"- 3, "Disagree"- 2, "Strongly disagree"- 1).

3.6. Statistical Analysis

For the sample's characterization, the descriptive analysis was performed according to variables. There were calculated central tendency measures [mean, median and standard deviation (SD)], relative frequencies (n) and absolute frequencies (%).

The *Kolmogorov-Smirnov* test was used to evaluate the variables' distribution ($30 < n < 100$).

The results obtained in the questionnaire applied before training (pre-intervention test), in the questionnaire applied after training (post-intervention test) and the age of the participants follow a normal distribution.

General linear model for repeated measures was performed to access the improvement on the participants' knowledge, after the FA training.

T-test for paired samples was performed to compare knowledge score means between the pre and post intervention test. To associate pairs of variables, *Spearman and Pearson* correlation coefficients were calculated.

There were also calculated the absolute and relative frequencies and the answers mode, to evaluate the participants' perceptions of FA at their workplaces.

A p- value ≤ 0.05 was considered statistically significant.

The collected data were analysed by the software *IBM® SPSS® Statistics* version 25.0 for *Microsoft Windows®*.

4. Results

4.1. Participant's characterization

The sample consisted of 64 participants, of which 10 (15.6%) were male and 54 (84.4%) were female. Their age ranged from the 29 to 65 years and the mean age was 50.0 (10.1). All the participants were inhabitants in Oporto's district. As to educational level, 23 participants (35.9 %) concluded the 9th grade (lower secondary education) and 22 (34.4 %) concluded primary education. Although, only 9 people (14.1 %) completed 12th grade (upper secondary education). In this sample, one of the individuals had no schooling at all.

All the participants were FH, but 7 of them were the food services' headmasters and all of them had previous experience in catering, but only 28.1% reported that this wasn't the first time attending training in FA.

The participants' characteristics are described on Table 1 (Attachment B).

4.2. Knowledge assessment

Regarding the results obtained on the pre-intervention test, the final mean (SD) score on the knowledge survey was 55.9 (11.6) % and on post-intervention was 63.8 (16.6) %. Results are described on Figure 2, Table 2 and 3 (Attachment B).

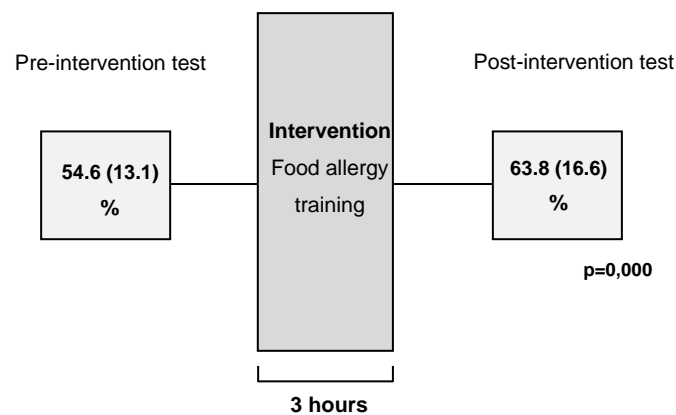


Figure 2- Food allergy knowledge score means of UP food services' professionals before and after training

On the first test, we can highlight question 5, related to FA diagnosis methods, and question 9, related to emergency procedures, as the ones with the highest percentage of wrong answers (89.1 % and 90.6 %, respectively). On questions 9 and 17, 21.9 % and 20.3 % of the participants answered “Don’t know”, respectively. The questions with the highest percentage of correct answers were the question 10, about food labelling, and the questions 14, 15 and 16, about good work practices. There was a statistically significant moderate negative correlation between the results and participant’s age ($r = -0,550$; $p = 0,000$), which means that the older ones tended to present lower knowledge levels.

The association between the participants’ education level and the results on the pre-intervention test showed a moderate, but statistically significant, positive correlation ($\rho = 0,507$; $p = 0,000$), which means that participants with a higher education level tended to have better results.

Regarding the results obtained on the post-intervention test, the final mean (SD) score on the knowledge survey was 63.8 (16.6) %. Results are described on the Tables 2 and 4 (Attachment B).

On the second test, we can highlight question 5, about FA diagnosis methods, to which most of participants answered incorrectly (98.4 %). Only one person answered correctly to this question and only two people answered “Don’t know”. Also questions 1, related to the distinction between FA and food intolerance, and 2, about major allergens, had high percentages of wrong answers (84.4% and 73.4%, respectively).

Comparing the results between the two tests, we verified that there was a statistically significant increase of 13.3 % [55.9 (13.1) % vs. 63.8 (16.6) %; $p < 0,001$]. However, the percentage of right answers wasn’t higher for all items on the post-intervention test.

On the post-intervention test, there were also statistically significant correlations between the test results and the participants’ age ($r = -0,378$; $p = 0,002$) and between the test results and the participants’ educational level ($p = 0,357$; $p = 0,004$).

There was a weak positive correlation, but statistically significant, between the two tests’ results ($r = 0,457$; $p = 0,000$), which means the participants who had better results on the pre-intervention test were the same who had better results on the post-intervention one.

4.3. Perceptions on Food Allergy

Concerning the participants’ perceptions of FA, summary of responses are described on Tables 5 and 6 (Attachment B).

According to the results in both questionnaires, the statement “I think it’s important to know more about FA” was the one with the highest percentage of total concordance (91.7 % in both tests) and no participant disagreed with it.

On the same way, 50 participants (83.3 %) on the pre-intervention test and 47 (79.7%) on the post-intervention test strongly agreed that it is part of their job and responsibility to provide and keep a safe environment to serve safe meals to allergic consumers.

However, on pre-intervention and post-intervention tests, it was verified that almost half of the participants agreed in some way that people with FA should avoid eating out (48.3% and 45.4%, respectively). Still, there were some participants who totally disagreed with the same statement (21.7% on pre-intervention test and 20.3% on post-intervention test).

Also, 90.0% of the respondents on the pre-intervention test and 88.1% on the post-intervention test agreed in some way that it is usual to receive customers with FA at their workplaces.

5. Discussion and conclusions

The main goal of this study was to assess the impact of a FA educational training on catering professionals' knowledge. Additionally, the results of this study also provided insight into the FA knowledge, practices, and attitudes towards FA of UP food services' professionals. The significant increase in participants' results in the knowledge survey, as well as the increase in the percentage of correct answers for each questionnaire item, showed that training can be an effective strategy to improve catering staff's knowledge in FA. All respondents revealed having some knowledge in FA, although there were some gaps that may affect the safety of meals' production and service. For example, they identified strawberry as a major allergen, instead of wheat, milk or fish and they didn't recognize the procedures to

follow in case of anaphylaxis. Also, most of participants didn't distinguish FA from food intolerance and they couldn't identify the diagnosis methods for FA.

These results are in line with the ones from a study carried out on a Mid-Western University in the United States, where it was found that university canteens' FH were not capable to identify the major allergens and to react on an emergency situation of anaphylaxis ⁽¹¹⁾.

These gaps can be particularly alarming, since identifying the major allergens is crucial for FH properly manage the preparation, production and service of safe meals and the communication with the allergic consumer. Since most allergic reactions that are fatal are related to the unavailability or the non-administration of adrenaline ⁽⁶⁾, recognizing the symptoms and knowing how to perform when in case of anaphylaxis is also fairly important for catering professionals.

Considering that the first line treatment for anaphylaxis is the immediate administration of adrenaline ⁽¹⁶⁾ and with the increasing of FA prevalence over the last 20-30 years ⁽⁷⁾, it is important for the governments to deliberate about the availability of an adrenaline auto-injector in public places, mostly the ones which are visited by many people and where food is served (such as schools, airports, shopping centres and universities).

In some states of the United States, there are already established policies of schools being stocked with adrenaline auto-injectors ⁽¹⁷⁾. However, for this measure to be successfully implemented, it will be necessary to provide training in this area and assess the predisposition of catering professionals to administer injectable adrenaline, since they may feel insecure or uncomfortable doing it, as it was already described by literature ⁽⁸⁾.

Despite these gaps and misconceptions, the participants were knowledgeable about food safety and hygiene, cross-contamination, preparation and cooking procedures. Since is mandatory by law implementing *Hazard Analysis and Critical Control Points* (HACCP)' principles, FH are used to food safety concepts and good practices. The regulation recommends that their implementation should be associated to training in order to be successful ⁽¹⁸⁾. Therefore, as good work practices in FA and food safety have some common points, the FH' knowledge in food safety is an asset for the subsequent implementation of specific measures to manage FA at food services and their integration in the HACCP plan.

Concerning the perceptions towards FA, FH showed a high level of confidence on their ability to produce and serve a safe meal to people with FA. These results have been reported by several other authors ^(6,19, 20). However, as already said, we found multiple gaps in FH' knowledge, which can compromise the safety of meals' production.

Despite this, almost half of the participants consented that costumers with FA shouldn't eat outside home, which can reflect their insecurity in ensuring the preparation and service of a safe meal for this public, at their workplaces.

Moreover, participants were aware that it is essential being more knowledgeable about FA and they recognize their responsibility in providing the necessary conditions for the service of a safe meal. The importance FH and catering professionals attach to providing a properly safe environment to produce and serve meals and to the knowledge they must have could be an incentive to the implementation of training that enhances their knowledge and work practices.

In addition, more than a half of the respondents reported it is common to serve customers with FA in their workplaces, which can justify their agreement with how

important is being more knowledgeable about FA. However, since FA and food intolerance are not distinguished by FH, they may also not distinguish customers with food intolerances from the allergic ones at their workplaces. Further research is needed to understand how many students and other customers with FA actually attend universities' food services and whether this numbers are in accordance with the reported by FH. It might also be advisable for universities' health services to screen individuals with FA to avoid undergoing unnecessary risks.

It is important to consider that university students, without parental supervision, are a higher risk group, either because of accidental contact with allergens, because they hide this problem from their friends or because they do not carry the adrenaline auto-injector with them ⁽¹¹⁾. Furthermore, most severe and fatal allergic reactions happen in adolescents and young adults ⁽⁶⁾ and universities may not be properly equipped to receive students with FA. To avoid serious situations, universities should implement strategies to ensure safe meals, through greater investment on FH' training, to guarantee a safer meal production, service and a better communication with the allergic costumers.

This study has some limitations that must be considered. First, the questionnaire's and training language should have been previously revised and adapted to the sample's characteristics.

We observed that some of the percentages of right answers didn't change between the pre-intervention and the post-intervention tests, even after the educational training. Knowing that the sample's education level is low, we may consider questionnaire's structure and language were not adapted to this sample. The participants may have found it difficult to understand some of the questions related to FA epidemiology, diagnosis, symptoms and treatment because they are not used

to this technical vocabulary. Moreover, one of the questions with highest percentage of wrong answers was related to service procedures, which can be due to various reasons.

On the one hand, participants may actually be unaware that an allergic individual should be served immediately by preventing their meal from being accidentally contaminated in the food-manufacturing area ⁽¹⁴⁾. But, on the other hand, this issue was addressed on the training, which also leads to consider the possible misunderstanding of the approach made during the session or the question's formulation. This specific question was the only one formulated in the negative form, throughout the entire questionnaire, asking to signal the wrong answer, rather than the correct one, what may have worked as a confounder for the participants, concerning their education level.

The training method also deserves prominence, because it may have influenced the participants' knowledge improvement.

According to one Brazilian study, training at the workplace, to better comprehension of the procedures, the guarantee of the best materials and resources to adopt good practices, the trainees' motivation and the setting of goals at work can be useful aspects to consider to the improvement of the training conditions and consequently the acquisition of knowledge. However, the training lasted 10 hours and it didn't follow any specific structured model ⁽²¹⁾. Similarly, the training provided to UP's food services professionals didn't follow any educational model previously structured, but it only lasted between 2 to 3 hours, due to the constraints arising from the staff's absenteeism from their workplaces. Moreover, there is evidence that on-line FA training can be an effective strategy to empower catering staff ^(3, 9). However, due to the participant's education level and age, this educational model could not be as effective.

Thus, it is necessary to develop more studies to explore if the knowledge improvement is influenced by training duration and which training techniques are most effective for long-term retention of important FA information in samples with different ages and educational levels.

Another limitation of this study was its duration. It was carried out in a short time period, so the participants answered immediately before and after training to the survey tests. Their attitudes in their workplaces were not directly evaluated too and this could be important to assess if the improvement of their knowledge was efficient to change attitudes and behaviours.

A FA training event, performed with restaurant staff in Brighton, did three evaluation tests: one before training, one immediately after training and another four weeks later ⁽⁹⁾. A similar approach could be interesting to adopt to evaluate long term improvement of knowledge, attitudes and practices in FA, applying a third test, after a longer period.

Despite this, there is more than evidence showing that training is an effective strategy to adopt in order to improve food safety and FA knowledge in catering staff ^(9, 11, 19, 20, 21, 22), whatever the training method.

Finally, towards the obtained results, it is necessary to rethink about health policies and strategies that empowers catering professionals, with knowledge and practices to prepare and serve a safe meal for people with FA. Concerning this, educational programs could be an important measure to reduce risks and provide a safe environment in public food services, particularly at places visited by young people, like schools' and universities' canteens.

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6. Attachments

Attachment A.- Questionnaire of evaluation of knowledge, practices and attitudes towards FA



Serviços de Ação Social da Universidade do Porto

Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto

QUESTIONÁRIO| ALERGIA ALIMENTAR| RESTAURAÇÃO

Idade: _____ anos

Sexo: M ___ F ___

Localidade: _____

Profissão: _____

Grau de escolaridade: _____

Tem experiência prévia na área da restauração? Sim ___ Não ___

É a primeira vez que frequenta uma formação em alergia alimentar? Sim ___ Não ___

1. Intolerância à lactose é uma alergia alimentar à proteína do leite.
 - a) Verdadeiro
 - b) Falso
 - c) Não sei

2. Qual dos seguintes alimentos não se inclui no grupo dos alergénios alimentares responsáveis por cerca de 90% das reações alérgicas?
 - a) Leite
 - b) Peixe
 - c) Morango
 - d) Trigo
 - e) Todos os anteriores se incluem

3. Comichão, borbulhas e dores abdominais são as únicas manifestações de uma reação alérgica a um alimento.
 - a) Verdadeiro
 - b) Falso
 - c) Não sei

4. Para uma pessoa ter uma reação alérgica a um alimento terá que o consumir.
 - a) Verdadeiro
 - b) Falso

- c) Não sei
5. **Dos seguintes, qual não tem interesse clínico para diagnóstico da alergia alimentar?**
- Prova de provocação oral
 - Teste de intolerância alimentar
 - História do doente
 - Teste cutâneo por picada
 - Todas têm interesse clínico para diagnóstico da alergia alimentar
6. **A alergia alimentar tem cura, através de medicamentos para as alergias.**
- Verdadeiro
 - Falso
 - Não sei
7. **Um doente com alergia alimentar à noz pode comer um bolo de aniversário decorado com noz, desde que se retirem as nozes do bolo antes de servir.**
- Verdadeiro
 - Falso
 - Não sei
8. **A que produtos deve um doente com alergia alimentar ter atenção?**
- Alimentos e produtos alimentares
 - Produtos de higiene e cosmética
 - Medicamentos não sujeitos a receita médica
 - Todas as anteriores
 - A+C
9. **Quais são os procedimentos a ter em caso de reação anafilática?**
- Chamar o INEM e de seguida perceber o que poderá ter causado a reação
 - Dar ao doente uma injeção de adrenalina e de seguida chamar o INEM
 - Dar ao doente um anti-histamínico e se não ficar bem dar uma injeção de adrenalina
 - Dar ao doente um anti-histamínico e de seguida chamar o INEM
 - Dar ao doente um anti-histamínico e de seguida perceber o que poderá ter causado a reação
 - Não sei.
10. **Quando o rótulo de um alimento diz "pode conter alergénios", a quantidade é muita pouca, pelo a que as pessoas com alergia alimentar podem consumir esse alimento.**
- Verdadeiro
 - Falso
 - Não sei



11. **Por lei, só nos produtos pré-embalados e rotulados tem que existir informação sobre a presença de alergénios alimentares**
 - a) Verdadeiro
 - b) Falso
 - c) Não sei

12. **Mudanças na receita de um prato, por falta de ingredientes, se forem pequenas e pontuais não necessitam de ser comunicadas aos funcionários do atendimento.**
 - a) Verdadeiro
 - b) Falso
 - c) Não sei

13. **Com as medidas nacionais face à legislação 1169/2011, a informação sobre alergénios pode ser fornecida única e simplesmente a pedido do consumidor.**
 - a) Verdadeiro
 - b) Falso
 - c) Não sei

14. **Para ralar cenoura para uma pessoa com alergia alimentar ao leite, podemos usar o ralador do queijo desde que este seja passado por água e retirados os pedaços visíveis de queijo.**
 - a) Verdadeiro
 - b) Falso
 - c) Não sei

15. **Uma pessoa com alergia ao peixe, pode comer peixe desde que este seja muito bem cozinhado (elevadas temperaturas, durante muito tempo).**
 - a) Verdadeiro
 - b) Falso
 - c) Não sei

16. **Para preparar peixe e marisco num estabelecimento de restauração podem-se usar as mesmas pinças para grelhar o peixe e o marisco, desde que sejam servidos em travessas separadas.**
 - a) Verdadeiro
 - b) Falso
 - c) Não sei

17. **Relativamente ao serviço de refeições para o doente com alergia alimentar, indique a afirmação errada.**
 - a) Mesmo que uma refeição seja convenientemente preparada na cozinha, poderá haver contaminação durante o serviço

- b) Mesmo que a refeição do cliente com alergia alimentar seja preparada primeiro, deve esperar na cozinha para ser servida com as outras, para não estigmatizar o cliente
- c) A mesa indicada ao cliente com alergia alimentar preferencialmente não deve ser perto da cozinha
- d) B+C
- e) Todas as afirmações estão corretas
- 18. Os talheres e pratos são utensílios a ter em atenção quanto à higienização, para que não haja risco de contaminação aquando da preparação de refeições para pessoas com alergia alimentar.**
- a) Verdadeiro
- b) Falso
- c) Não sei
- 19. Dos seguintes utensílios, o que pode representar uma fonte de contaminação cruzada?**
- a) Eletrodomésticos como torradeiras.
- b) Latas e recipientes abertos no frigorífico
- c) Esponja para lavar a louça
- d) Todas as anteriores
- e) A+B
- 20. As fichas técnicas permitem uma maior padronização das receitas, pelo que são uma ferramenta importante na gestão da alergia alimentar.**
- a) Verdadeiro
- b) Falso
- c) Não sei

	Concordo Plenamente	Concordo em parte	Nem concordo nem discordo	Discordo em parte	Discordo totalmente
1. É comum o meu estabelecimento receber clientes com alergia alimentar.					
2. No meu estabelecimento conseguimos preparar uma refeição segura para um cliente com alergia alimentar.					
3. Eu consigo identificar os alergénios alimentares presentes nos alimentos/refeições servidos no meu estabelecimento.					
4. Faz parte do meu trabalho providenciar e manter um ambiente e refeições seguras para os clientes com alergia alimentar.					

5. Preocupa-me o facto de os meus funcionários não saberem lidar com clientes com alergia alimentar.					
6. Eu acho importante saber mais sobre alergia alimentar.					
7. Eu acredito que algumas alergias indicadas pelos clientes não são verdadeiras.					
8. Eu sei o que fazer se um cliente tiver uma reação alérgica.					
9. Para os funcionários de estabelecimentos de restauração, a alergia alimentar deve ser uma preocupação.					
10. Os indivíduos com alergia alimentar deviam evitar comer fora de casa.					

Attachment B.- Tables and Figures

Table 1- Sociodemographic characterization of the participants.

Demographic characteristics		n (n=64)	%
Age	20-30	2	3.1
	31-40	11	17.2
	41-50	13	20.3
	51-60	28	43.8
	>60	10	15.6
Gender	Female	54	84.4
	Male	10	15.6
Locality (town hall)	Vila Nova de Gaia	13	20.3
	Porto	27	42.2
	Maia	7	10.9
	Matosinhos	4	6.3
	Paredes	2	3.1
	Gondomar	8	12.5
	Valongo	3	4.7
Occupation	Food service's responsible	7	10.9
	Operational assistant	57	89.1
Educational level	No years of schooling	1	1.6
	Primary school	22	34.4
	2nd cycle	9	14.1
	3 rd cycle	23	35.9
	Secondary school	9	14.1
Do you have previous experience on catering?	Yes	64	100
	No	0	0
Is it the first time attending training in FA?	Yes	46	71.9
	No	18	28.1

Table 21. Evaluation of UP food services' professionals' knowledge in Food Allergy: percentages of correct answers on the pre and post-intervention tests

	Questions	Correct answers (%)	Correct answers (%)
		Pre-intervention test (n=64)	Post-intervention test (n=64)
Food Allergy General Concepts	Q1. Allergy vs. intolerance	15.6	15.6
	Q2. Major Allergens	12.5	26.6
	Q3. Sign and symptoms	51.6	63.5
	Q4. Causes of an allergic reaction	29.7	66.7
	Q5. Diagnose methods	10.9	1.6
	Q6. Treatment	42.2	69.9
Allergen Avoidance	Q7. Cross-contact concept	79.7	93.7
	Q8. Allergens ubiquity	21.9	49.2
	Q9. Emergency procedures	9.4	27
	Q10. Precautionary labeling	85.9	85.7
	Q11. Food allergens labeling	67.2	82.5
Good work practices	Q12. Communication between co-workers	73.4	87.3
	Q13. Food allergens declaration	57.8	76.2
	Q14. Cross contact prevention	85.9	93.7
	Q15. Cooking procedures	90.6	96.8
	Q16. Preparation procedures	87.5	98.4
	Q17. Service procedures	12.5	27
	Q18. Cleaning procedures	78.1	85.7
	Q19. Cross-contact fonts	35.9	60.3
Q20. Recipes and technical datasheets	76.6	88.9	

Table 3- Evaluation of UP food services' professionals' knowledge in Food Allergy before training: percentages of correct and "Don't know" answers on pre-intervention test

Questions		Correct answers (%)	"Don't know"/ No answer (%)
Food Allergy General Concepts	Q1. Allergy vs. intolerance	15.6	1.6
	Q2. Major Allergens	12.5	3.1
	Q3. Sign and symptoms	51.6	9.4
	Q4. Causes of an allergic reaction	29.7	1.6
	Q5. Diagnose methods	10.9	9.4
	Q6. Treatment	42.2	9.4
Allergen Avoidance	Q7. Cross-contact concept	79.7	6.3
	Q8. Allergens ubiquity	21.9	4.7
	Q9. Emergency procedures	9.4	21.9
	Q10. Precautionary labeling	85.9	12.5
	Q11. Food allergens labeling	67.2	9.4
Good work practices	Q12. Communication between co-workers	73.4	7.8
	Q13. Food allergens declaration	57.8	15.6
	Q14. Cross contact prevention	85.9	4.7
	Q15. Cooking procedures	90.6	6.3
	Q16. Preparation procedures	87.5	4.7
	Q17. Service procedures	12.5	20.3
	Q18. Cleaning procedures	78.1	9.4
	Q19. Cross-contact fonts	35.9	9.4
	Q20. Recipes and technical datasheets	76.6	10.9

Table 4- Evaluation of UP food services' professionals' knowledge in Food Allergy after training: percentages of correct and "Don't know" answers on post-intervention test

Questions		Correct answers (%)	"Don't know"/ No answer (%)
Food Allergy General Concepts	Q1. Allergy vs. intolerance	15.6	1.6
	Q2. Major Allergens	26.6	3.2
	Q3. Sign and symptoms	63.5	1.6
	Q4. Causes of an allergic reaction	66.7	0
	Q5. Diagnose methods	1.6	3.2
	Q6. Treatment	69.9	9.5
Allergen Avoidance	Q7. Cross-contact concept	93.7	1.6
	Q8. Allergens ubiquity	49.2	6.3
	Q9. Emergency procedures	27	9.5
	Q10. Precautionary labeling	85.7	1.6
	Q11. Food allergens labeling	82.5	0
Good work practice	Q12. Communication between co-workers	87.3	0
	Q13. Food allergens declaration	76.2	3.2
	Q14. Cross contact prevention	93.7	3.2
	Q15. Cooking procedures	96.8	0
	Q16. Preparation procedures	98.4	0
	Q17. Service procedures	27	11.1
	Q18. Cleaning procedures	85.7	0
	Q19. Cross-contact fonts	60.3	3.2
	Q20. Recipes and technical datasheets	88.9	3.3

Table 5- Evaluation of UP food services' professionals' perceptions in Food Allergy on the pre-intervention test

Items	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mode
1- In my establishment is usual to receive people with FA	1.7	5.0	3.3	16.7	73.3	5- Strongly agree
2. In my establishment we can prepare a safe meal for people with FA	3.3	6.7	6.7	20	63.3	5- Strongly agree
3. I can identify the food allergens present in the food/ meals served in my establishment	12.7	3.6	7.1	53.6	28.6	4- Agree
4. It's part of my job provide and maintain a safe environment and meals for people with FA	1.7	1.7	5	8.3	83.3	5- Strongly agree
5. I am worried that my employees don't know how to handle FA	0	3.4	5.1	20.3	71.2	5- Strongly agree
6. I think it is important to know more about FA	0	0	1.7	6.7	91.7	5- Strongly agree
7. I believe some allergies indicated by the costumers are not real	6.9	5.2	24.1	27.6	36.2	4- Agree
8. I know how to react when a customer is having an allergic reaction	17.9	8.9	17.9	26.8	28.6	5- Strongly agree
9. FA should be a major concern for people who work on catering	3.3	1.7	6.7	11.7	76.7	5- Strongly agree
10. People with FA should avoid eating out	21.7	13.3	16.7	25	23.3	4- Agree

"Strongly agree"- 5, "Agree"- 4, "Neutral"- 3, "Disagree"- 2, "Strongly disagree"- 1

Table 6- Evaluation of UP food services' professionals' perceptions in Food Allergy on the post-intervention test

Items	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mode
1- In my establishment is usual to receive people with FA	0	6.8	5.1	20.3	67.8	5- Strongly agree
2. In my establishment we can prepare a safe meal for people with FA	6.8	0	1.7	23.7	67.8	5- Strongly agree
3. I can identify the food allergens present in the food/ meals served in my establishment	5.1	0	10.2	40.7	44.1	5- Strongly agree
4. It's part of my job provide and maintain a safe environment and meals for people with FA	3.4	0	0	16.9	79.7	5- Strongly agree
5. I am worried that my employees don't know how to handle FA	1.7	3.4	3.4	25.4	66.1	5- Strongly agree
6. I think it is important to know more about FA	0	0	0	8.3	91.7	5- Strongly agree
7. I believe some allergies indicated by the costumers are not real	5.3	5.3	21.1	29.8	38.6	5- Strongly agree
8. I know how to react when a customer is having an allergic reaction	5.1	1.7	11.9	35.6	45.8	5- Strongly agree
9. FA should be a major concern for people who work on catering	1.7	1.7	0	8.3	88.3	5- Strongly agree
10. People with FA should avoid eating out	20.3	7.8	21.9	26.6	18.8	4- Agree

"Strongly agree"- 5, "Agree"- 4, "Neutral"- 3, "Disagree"- 2, "Strongly disagree"- 1