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Food healthy knowledge, attitudes and practices: Survey of the general public and food handlers☆

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ABSTRACT

Modifying the energy content of foods, particularly foods eaten away from home, is important in addressing the obesity epidemic. Food handlers in the restaurant industry are uniquely placed to influence the provision of reduced-calorie foods, but little is known about their opinions on this issue. The objectives of the present study were to determine the general public and food handlers' knowledge and opinions, issues and barriers related to providing these items on the menu, and about the influence of the calorie content of restaurant items on customer intake. The food handlers surveyed had a significantly lower food science knowledge score than the general public. There was significant difference between the scores of food handlers and general public (t=3.5108, df=177.743, P-value=0.0005). The majority of respondents ranked taste as the most influential factor in the success of reduced-calorie items ($p < 0.0028$). The results of this survey indicate that opportunities exist for reducing the energy content of restaurant items. Ongoing collaboration is needed between food handlers and public health professionals to ensure that appealing reduced-calorie menu items are more widely available in restaurants and that research is directed towards effective ways to develop and promote these items.

Introduction

Recent literature suggests that nutritional counseling should move from micro- and macronutrients into food-oriented education (Lichtenstein and Ludwig, 2010). Part of the proposed solution is supplementing standard knowledge counseling about healthy nutrition with skills like shopping, meal preparation and food storage (Soliah et al., 2012; Hartmann et al., 2013). Educational programs delivered by food handlers aimed at improving culinary skills have recently emerged as one way to improve adherence to nutritional guidelines (Reicks et al., 2014).

Over the past 30 years, food prepared away from home has become a regular part of most European's diets, and those who monitor food trends expect this to continue (Orfanos et al., 2009). Foods prepared away from home accounted for 33% of food spending (MAPA, 2012) and contributed 27% of caloric intake (Vandevijvere et al., 2009). The catering sector is therefore an important stakeholder in the provision of nutrition policies in Europe (Lachat et al., 2009). It is uniquely placed to be involved in the implementation of effective strategies aiming to promote healthier eating out, but little is known about their opinions on this issue. In order to support this objective, however, it is important to address the concerns and knowledge of food handlers about providing such foods (Obbagy et al., 2011).

Finally, with direct reference to this study, do food handlers feel it is part of their role to help re-engineer the nation's diet? There has been much research regarding consumers' attitudes to various issues but as intimated by Condrasky and Helger (2010), there has been little research carried out regarding food handlers' attitudes. As they are directly involved in food preparation and provision and have been given responsibility to carry out these government inspired strategies it would seem appropriate to consider their attitudes, opinions and knowledge especially as they are also consumers (Middleton, 2000).

The objectives of the present study were to determine the general public and food handlers' knowledge, and opinions, issues and barriers related to providing these items on the menu healthy (low in fat and energy; reduce the amount of food protein and increase the intake of vegetable), and about the influence of the calorie content of restaurant on customer intake.

Materials and methods

The surveys assessed the knowledge of healthy food in the general public and food handlers. The survey given to both groups was a modified a survey used in a previous similar study (Reichler and

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Table 1
Food science knowledge survey.

Questions	Food handlers		General public		Correct response
	Correct %	Incorrect%	Correct %	Incorrect %	
1. There is more fiber in breads, rice, and vegetables than there is in meat, poultry, and eggs	87,8	12,2	85,2	14,7	C
2. Meat, fish, chicken, eggs, milk, legumes, grains, and vegetables contain protein	68,6	31,3	100	0	C
3. Prepackaged processed foods are a major source of salt in the Mediterranean diet	69,5	30,4	87,2	12,7	C
4. An orange contains more fiber than orange juice	58,5	41,4	88,3	11,6	C
5. Sugar contains many vitamins and minerals	46,3	53,6	29,4	70,5	I
6. The largest source of fat in the comes from animal foods	53,6	46,3	47,0	52,9	C
7. Milk, vegetables, grains, and fruits contain carbohydrates	60,9	39,0	74,5	25,5	C
8. To lower cholesterol in your blood, you only need to avoid foods that are high in cholesterol	17,0	82,9	12,7	87,2	I
9. Cooking at high temperatures diminishes the vitamins in foods	50,0	50,0	64,7	35,3	C
10.If a food is labeled “cholesterol free”, it must also be low in saturated fat	43,9	56,1	26,4	73,5	I
11.You can reduce the amount of fat in a recipe by substituting olive oil or corn oil for butter, lard or chicken fat	43,9	56,1	22,5	77,4	I
12.One tsp olive oil has about the same amount of calories as 1 tsp butter	29,2	70,7	20,5	79,4	C
13.Cholesterol is found only in animal products	40,2	59,7	32,3	67,6	C
Correct answers (%)	**59**		**72**		

[a]C=Correct/I=Incorrect * tsp=teaspoon.

Table 2
Recipe modifications most likely to be used by food handlers and general public.

Recipe modification	Food handlers		General public	
	(*n*)	(%)	(*n*)	(%)
1. Reduce fat	33	41,2	11	10,8
2. Reduce portion size	38	47,5	8	7,8
3. Add fruits or vegetables	8	10,0	74	72,5
4. Reduce carbohydrates	0	0	9	8,8
5. Add fiber	1	1,2	0	0
6. Reduce protein	0	0	0	0
Total answers	**80**	**100**	**102**	**100**

n: number of responses.

Table 3
Recipe modification of moist rice.

Recipe modification of Moist rice	Food handlers		General public	
	(*n*)	(%)	(*n*)	(%)
Portion size	2	8,7	0	0
Energy dense	21	91,3	56	100

n: number of responses.
Number of responses (n) do not sum to the total number of respondents because some respondents do not answer the question.

Dalton, 1998) and assessed awareness of healthy food, knowledge, and opinions. The questionnaire was comprised of 13 questions (Table 1) to assess the knowledge about nutrition in general, and 6 questions (Table 2) about changes to the recipes that would make (food handlers and general public) to healthier dishes (reduce fat, reduce portion size, add fruits and vegetables,...). Finally are being asked to indicate that they would take to reduce the calories of a recipe (moist rice), change the serving size or reduce the energy density (Table 3). The concept of menu healthy is based at the premises indicated by agencies international (Aranceta and Serra Majem, 2011; EFSA, 2009; FAO/WHO, 2008**)**.

The initial survey was conducted in 15 restaurants in downtown of Valencia (Spain) and representing a total of 80 food handlers including cooks, kitchen assistants, and service assistance. Each food unit had at least four food handlers and at most eight. The following services were provided by these establishments: the prix-fixe multi-course menu changes daily, and showcases local ingredients. The supervisors of each unit were first contacted, and their authorization requested in order to conduct the survey. After obtaining the authorization, each unit was visited and the food handlers informed about the reason to conduct the survey and how they should proceed when they received the questionnaires. It was explained that they did not need to reveal their identity. After completing the questionnaires, the food handlers were supposed to mail them back to the addressee.

The same questionnaire used for the food handlers was given to the general public, and assessed awareness of healthy food. The general public was recruited at the restaurants selected for this pilot study by face-to-face interviews and representing a total of 102 people.

A convenience sample was presented to 182 food handlers and general public. Convenience sampling occurs when members of the respondent population are chosen based on their relative ease of access, in this case those food handlers and general public present at the restaurants and willing to complete a survey (García-García et al., 2013).

Comparisons between food handlers and the general public were performed using the analysis of variance (ANOVA) and independent *t*-test were used to examine significant differences in food healthy knowledge, attitudes and practices. Questionnaires were hand coded and data was analyzed using Statistical Package for Social Sciences (SPSS) version 19.0.

Results and discussion

The result of the surveys (% of correct answers) show that the food handlers had a significantly lower food science knowledge score (59%) than the general public (72%). There was significant difference between the scores of food handlers and general public (t=3.5108, df=177.743, P-value=0.0005). Significantly, the food handlers′ ability to construct nutritionally sound menus and indeed cook healthily is brought into question.

The questions most often answered correctly related to food sources of protein and salt and more than half of the respondents correctly responded to questions concerning the nutrient composition of food, and how cooking affects the nutrient content of foods. Questions most often answered incorrectly related to cholesterol and fat. The question least often answered correctly by both groups was, “One that 1 tsp (teaspoon) olive oil has about the same number of kilocalories as 1 tsp butter” and “Cholesterol is found only in animal products”. The questions most often answered incorrectly by food handlers were, “An orange contains more fiber than orange juice”; “Sugar contains many vitamins and minerals”; “Cooking at high temperatures diminishes the vitamins in food”; “If a food labeled “cholesterol free”, it must also be low in saturated fat” and “You can reduce the amount of

fat in a recipe by substituting olive oil or corn oil for butter, lard or chicken fat". The results of food science knowledge questions it is presents in Table 1.

A major topic requiring clarification among food handlers and general public is practical information about amounts and types of fats in food and the role of fat in the body and in healthful diets. The comparison figures in the American study (Reichler and Dalton, 1998), conducted in New York (United States) related the same mistake save some exception.

Table 2 present mean scores on use of food preparation. Of the healthful food preparation analyzed, the general public select adding fruits and vegetables, on the other hand, the food handlers were most likely to reduce portion size to menu items. This results are opinions and not necessarily practice.

In contrast, when both groups were asked to choose a recipe manipulation to reduce the calories in a specific menu items (moist rice), food handlers were more likely to select strategies for reducing energy density than for reducing portion size (Table 3). The answers of the respondents are opinions and does not mean to bring it into practice.

In contrast, when both groups were asked to choose a recipe manipulation to reduce the calories in a specific menu items (moist rice), food handlers were more likely to select strategies for reducing energy density than for reducing portion size (Table 3). The answers of the respondents are opinions and does not mean to bring it into practice. A significantly greater proportion of both group reported that they would prepare healthier dishes of moist rice, adding vegetables strategy that reduces energy density.

The current confusion and mistrust about the issue of health and food and the constantly changing dietary advice highlighted by a number of researchers manifests itself in this study whereby food handlers appear to have adopted their own ways of developing healthy menus based upon their own experiences and perceived knowledge (Condrasky et al., 2010). Most of the food handlers reported in this study were more likely to select methods that reduced energy density, decrease the calorie content of specific recipes rather than choosing to reduce portion size. Many food handlers, however, seemed to be unfamiliar with the concept of energy density as expressed by "reducing calories per bite", since a relatively small proportion identified this as a general strategy for reducing calories. Food handlers also seemed less aware of the role of water-rich ingredients such as fruit and vegetables in reducing energy density. Incorporating more nutrition education in culinary training could provide a greater understanding of the conceptual basis for recipe modifications used in creating reduced-calorie menu items. On the other hand, general public reported were more likely to select methods that reduced energy density on both case reported more coherence between the concept about energy dense and portion size.

Among several characteristics of reduced-calorie foods that may affect their success on a restaurant menu, a majority of respondents for both group (55,0% and 44,1% for food handlers and general public, respectively) ranked taste as the most important factor (Table 4). The next most common factors were food health promotion and good value, with significantly fewer respondents selecting the characteristics of portion size. Only 16,9% of respondents believe that none of options may affect their success on a restaurant menu.

Food handlers and general public may have been reluctant to change higher-calorie items because of concerns about adverse effects on palatability, and thus potential risks to profits (Economos et al., 2009). The consumers have learnt that they should take into account the effects for their health when choosing foods, but this process is largely restricted to the intentional search for and cognitive evaluation of food attributes. When it comes to sensory evaluation as a major driver of the actual purchase decision, many consumers are not ready to compromise (e.g., functional foods) (Verbeke, 2006). Eating habits are difficult to change because of a key goal conflict with which many consumers are faced: the belief that healthy food is less tasty (so called unhealthy=tasty intuition) (Raghunathan et al., 2006). Health communication tackles only one part of this inverse relationship. To resolve the conflict and to mitigate this widespread unhealthy=tasty intuition, it is of pivotal importance to provide consumers with healthier and tastier food. This problem is considered a cornerstone to maintain a healthy diet over time and to achieve sustainable and lasting changes. It is likely that the primary concerns of food handlers at management levels were related to the factors they believe will increase sales or profit (Glanz et al., 2007). Thus, it will be increasingly important that food handlers in these influential positions stay informed of customer changes in health-related attitudes toward foods eaten away from home.

Table 5 presents mean scores on opinions toward nutrition and the obstacles in healthy food preparation. Opinions toward the importance of knowledge about nutritional information for food handlers were very positive and similar for both groups.

Responses to the question if food handlers are responsible for their customers' health in relation to healthy eating gave an insight into the ways in which food handlers and general public view their role and responsibilities. The general public surveyed had a significantly positive result 93,2% believe it is important the food handlers knows the nutritional information of the dishes and 79,4% believe the food handlers are responsible for their customer's health in relation to healthy eating. A substantial proportion of chefs (71,4%) felt a responsibility towards their customers and 76,8% believe it is important the food handlers know the nutritional information of the dishes. The illustrated the positive predisposition held by food handlers and general public towards healthy eating.

Similar studies have been identified in the American study, conducted in U.S. culinary meetings and public in 2011 (Obbagy et al., 2011), as well as in Scottish, the study conducted in Edinburgh (United Kingdom) (Middleton, 2000), and the study of thirty-eight participants from sixteen European countries reflecting a broad multi-stakeholder panel on eating out in Europe (Lachat et al., 2010). The respondents identified the main barriers to including reduced-calorie items on the menu as low consumer demand, the need for staff skills and training, and high ingredient cost. The literature also suggested that an additional barrier to providing healthier options is that food

Table 4
Characteristics of reduced-calorie menu items ranked as the most influential for success by food handlers in different positions.

Characteristic	Food handlers		General public	
	(*n*)	(%)	(*n*)	(%)
1. Taste	44	55,0	45	44,1
2. Portion size	3	3,7	6	1,9
3. Promotes good health	19	23,7	27	26,4
4. Price	13	16,2	8	7,8
5. None	1	1,2	16	15,7

n: number of responses.

Table 5
Mean scores of food handlers and general public on attitude survey items.

Questions	Food handlers		General public	
	Yes (%)	No (%)	Yes (%)	No (%)
Is it important the food handlers knows the nutritional information of the dishes?	76,8	23,2	93,2	6,8
Do the food handlers are responsible for the nutritional content of the food they prepare?	71,4	28,6	79,4	20,6

handlers often believe that they lack sufficient skills to prepare healthier options; this could potentially be addressed by having them work with a chef (Cho and Nadow, 2004). Because the foods designed by chefs are more appealing, or due to the education and instruction provided by the chef could collaborate with staff to enhance multiple aspects of the catering foods. These results further highlight the importance of continuing innovation in culinary practice, emphasizing skills needed to create reduced-calorie dishes that promote health while ensuring that costs are controlled and taste and acceptability are not compromised.

Results have shown that a large proportion are amenable to the idea of nutrition training, and indeed the positive attitudes and practice exhibited could conceivably be viewed as a spring board for nutrition education. According to Hildebrand et al. (2015), the context of the information is of paramount importance to the success of the education. It is therefore posited that the provision of short courses which are an important feature of the food safety approaches, and which have successfully raised awareness and understanding of the principles of food hygiene equally could be applied to nutrition and healthy eating, whilst dissemination of ideas amongst peers could be used as a vehicle to promote good practice.

Conclusions

This study provided information about food handlers' healthy knowledge and, opinions. Although this study has illustrated the positive predisposition held by food handlers and general public towards healthy eating, it is evident that a more pragmatic planning approach needs to be taken on a wider context to ensure the successful implementation of healthy eating principles. Even though the survey showed that food handlers and general public had some knowledge on the issues, they possess no much more than the average general public.

Educating food handlers about healthy food may alleviate the obesity and, restaurants should work toward providing not only food safety training as it relates to preventing microbial contamination but also provide training specific to healthy food. The results of this survey support the need for ongoing collaboration between food handlers and public health professionals to ensure that appealing reduced-calorie menu items are more widely available in restaurants and that research is directed towards understanding the most effective ways to develop and promote customers well-being.

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