A preliminary study of chefs’ knowledge and attitude towards nutrition during restaurant’s food handling

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Abstract

Background. Increasing the frequency of eating out in restaurants contributes to an increase in the prevalence of non-communicable diseases. The quality of restaurant dishes depends on the chef’s ability to process delicious food and the chef’s understanding of nutrition in healthy food processing. Nutritional knowledge and attitudes towards nutrition from chefs are very important if nutrition and health aspects are the basis for consideration of food selection.

Objective. The objective of this study is to assess the chef’s nutrition knowledge and attitudes toward nutrition during the restaurant’s food handling.

Methods. A cross-sectional approach and descriptive design were used in this research. Chef nutritional knowledge and attitudes were measured using a structured questionnaire through three question topics including food preparation, food processing, and food presentation.

Results. Chefs have good nutritional knowledge about food presentation and plating (66.7%) and good attitudes towards nutrition in relation to food preparation, food processing and molecular gastronomy techniques, and food presentation and plating (83.3, 79.3, and 86.1% respectively). Educational background and work experience influence the knowledge and practice of food handling during processing.

Conclusion. There is a significant relationship between a chef’s educational level, years of working experience and nutritional knowledge. But educational levels, years of working experience, and the availability of standard operating procedures in restaurants were not significantly related to the chef’s nutritional attitude.

Introduction

Among the various existing food service facilities, restaurants account for 77.8% of sales from food consumed outside the house.1 The increasing of eating out activities brings attention to the important role of the restaurant chef during food preparation.2,3 The food processing skills of food handlers in the restaurant industry affect the quality of the food supply. Chef’s perceptions of health, nutrition, practice, and attention to consumers are considered influential in the context of menu planning and food service.

Quality of raw materials, skills of food handlers, equipment used during food processing in the kitchen, and the use of standard recipes are aspects that must be considered during producing good quality food in restaurants. The chef has an important role in preparing and serving healthy food and improving the nutritional quality of eating out. The chef has a responsibility to control the ingredients used during food preparation and provide healthy culinary options. In addition, chefs are also required to make healthy food without any impact on the attractiveness of the menu for consumers, the aesthetics of serving, and the profitability of the restaurant.2,4,5 Chefs have an important role in determining the nutritional composition of foods and influencing the food choices of consumers.5 Chefs may have good knowledge and nutrition awareness, food safety and hygiene practices in relation to making a good service quality. According to the survey conducted by Obbagy et al.,7 chefs argue that calories can be reduced by 10-25% in a dish without affecting the taste.

The chef’s knowledge, attitude, and practices related to nutrition and health are very important to satisfy the expectation and needs of consumers who are increasingly aware of nutrition and...
The depth and breadth of nutrition knowledge will guide a person in choosing the type of food to be consumed, both in terms of quality, variety, and processing methods that are aligned with the concept of safe and healthy food. The lack of educational experience and knowledge is one of the reasons behind food handlers’ non-compliance with food processing of nutrition. The percentage of food handlers who have nutritional knowledge from formal institutions is very low (54.8%), while the rest get nutritional knowledge from non-formal institutions such as family, friends, and social media. 34% of food handlers have never had experience in nutritional knowledge. The two main problems that hinder the practice of nutrition in most restaurants are the lack of the chef’s experience in nutrition education and training with the absence of written nutrition guidelines implemented during food processing. This has implications for the lack of nutritional knowledge, attitudes towards nutrition, and nutritional practices of chefs in preparing dishes, as well as the nutritional quality of dishes that do not meet balanced nutritional standards.

The nutritional content policy of food can be regulated by nutritionists and related institutions, but chefs and food handlers remain the main determinants who play a role in food processing, and the health of served food.

Chefs have the opportunity to establish and provide healthy food choices for a community with interesting tastes. The objective of this study is to assess the chef’s nutrition knowledge and attitudes towards nutrition during the restaurant’s food handling. This study also examined the association of educational level, work experience, and standard operating procedures (SOPs) with the knowledge and attitude of restaurant chefs.

Materials and Methods
Research population and data collection
A cross-sectional approach and descriptive design were used in this research. This study was conducted in a la carte restaurants located in Surabaya, East Java, Indonesia from June until September 2022. The population of this study comprised chefs of 12 a la carte restaurants in Surabaya. A simple random sampling was used to select 36 chefs and 5 a la carte restaurants in Surabaya from a total of 71 chefs. All chefs were recruited as a respondent to fulfill the inclusion criteria. The inclusion criteria were a chef who works in a restaurant with a minimum of a year of work experience, cooperative, and willing to be a research respondent. Data were collected through guided self-administered questionnaires which were distributed to restaurant chefs and received approval from restaurant management.

Questionnaire and statistical analysis
A structured questionnaire comprised of personal/demographic information, level of education and nutritional education experience, working experience, SOPs in the kitchen, nutritional knowledge, and attitude toward nutrition was used for data collection. A nutrition knowledge questionnaire was prepared based on the balanced nutrition guideline in Indonesia. The nutrition questionnaire was divided into three assessment points (food preparation; food processing; and food presentation) including hygiene and sanitation aspects which were assessed through a validated questionnaire. The questionnaire consisted of 28 close-ended questions as follows: 4 questions for demographic information, 3 questions for the level of education and nutritional education experience, 7 questions about SOPs in the kitchen, and 14 questions regarding the attitude towards nutrition, and 14 open questions for the nutritional food knowledge questionnaire. For the score, nominal and ordinal data scale was used for personal information data and SOPs in the kitchen. Zero points were given for incorrect answers and one point was given for correct answers. For the attitude towards nutrition score, the Linkert scale point (1-5) was used to describe the chef’s attitude towards nutrition. The data from this study were analyzed using inferential statistics analysis for hypothesis testing. The relationship between the level of education and nutritional education experience, working experience, SOPs in the kitchen, nutritional knowledge, and attitude towards nutrition were analyzed using chi-square analysis in SPSS version 26.0.

Consent and ethical considerations
Oral consent was taken from the participant prior to data collection. All information collected is kept confidential by removing participants’ identities such as names and other personal information provided. The protocol for ethical considerations in this study was approved by the Health Research Ethical Clearance Commission Universitas Airlangga Faculty of Dental Medicine (approval number – 031/HRECC.FODM/I/2022).

Results
Sociodemographic characteristics of respondents
Table 1 shows the respondent’s ages were between 18 and 40 years. It shows that the majority of the respondents (69.4%) were between 26-33 years old. This implies that the majority of chefs fall between the ages of 26-33, this is because they are in their productive or economic age. This study showed that the majority of the respondents (61.1%) was male while the rest (38.9%) were female. This study revealed that the majority (66.7%) went to tertiary institutions while the rest (33.3%) of respondents stopped at secondary school. This implies that the majority (66.7%) of the chefs in this study were quite educated.

Nutrition knowledge
As shown in Table 2, the highest score of the chef’s nutritional knowledge is about food presentation and plating (66.7%).

Table 1. Percentage distribution of respondents based on personal information.

<table>
<thead>
<tr>
<th>Personal characteristics</th>
<th>Percentages (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>18-25</td>
<td>13.9</td>
</tr>
<tr>
<td>26-33</td>
<td>69.4</td>
</tr>
<tr>
<td>34-40</td>
<td>16.7</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>38.9</td>
</tr>
<tr>
<td>Male</td>
<td>61.1</td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>33.3</td>
</tr>
<tr>
<td>Tertiary</td>
<td>66.7</td>
</tr>
</tbody>
</table>

Table 2. Nutrition knowledge of chef.

<table>
<thead>
<tr>
<th>Nutrition knowledge indicators</th>
<th>Score (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition guidelines</td>
<td>38.9</td>
</tr>
<tr>
<td>Food preparation</td>
<td>48.6</td>
</tr>
<tr>
<td>Food processing and technique</td>
<td>40.6</td>
</tr>
<tr>
<td>Food presentation and plating</td>
<td>66.7</td>
</tr>
</tbody>
</table>
Meanwhile, only 38.9% of chefs know about nutrition guidelines. Scores for food preparation; and food processing and techniques were 48.6 and 40.6% respectively.

**Attitude towards nutrition**

Data on attitude towards nutrition is presented in Table 3. The highest score of chef’s attitudes towards nutrition is about food presentation and plating (86.1%) including how to improve the aesthetics of the dishes, followed by scores of food preparation (83.3%) and food processing and technique (79.3%).

**Association between chefs’ factors to knowledge and attitudes toward nutrition**

Table 4 shows the association between the educational level and working experience with the nutrition knowledge of chefs. Based on the results in Table 4, there is a significant relationship between a chef’s educational level, years of working experience and nutritional knowledge. Different results were obtained for the study of the relationship between educational levels, years of working experience, the availability of SOPs in restaurants and the attitude toward nutrition of chefs (Table 5). Educational levels, years of working experience and the availability of SOPs in restaurants were not significantly related to the chefs’ nutritional attitude. SOPs are food processing guidelines as a reference available in the workplace.

**Discussion**

The majority of the restaurants were a la carte restaurants that operated from 8.00 am to 10.00 pm. Restaurants peak serving times were between 11.00 am to 1.00 pm and 6.00 pm to 9.00 pm. The majority of respondents are of productive age. This is in agreement with the findings that people of this age bracket have more cooking skills.9

**Table 3. Attitude towards nutrition of chefs.**

<table>
<thead>
<tr>
<th>Attitude toward nutrition indicators</th>
<th>Score (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food preparation</td>
<td>83.3</td>
</tr>
<tr>
<td>Food processing and technique</td>
<td>79.3</td>
</tr>
<tr>
<td>Food presentation and plating</td>
<td>86.1</td>
</tr>
</tbody>
</table>

**Table 4. Association between educational level and working experience to nutrition knowledge of chef.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chi-square</th>
<th>df</th>
<th>Level of significance</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational level</td>
<td>12.386</td>
<td>1</td>
<td>0.000</td>
<td>S</td>
</tr>
<tr>
<td>Working experience</td>
<td>14.063</td>
<td>1</td>
<td>0.000</td>
<td>S</td>
</tr>
</tbody>
</table>

df, degrees of freedom; S, significant.

**Table 5. Association between educational level, working experience and availability of standard operating procedures in restaurants to attitude towards nutrition of chef.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chi-square</th>
<th>df</th>
<th>Level of significance</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational level</td>
<td>7.971</td>
<td>1</td>
<td>0.008</td>
<td>NS</td>
</tr>
<tr>
<td>Working experience</td>
<td>2.914</td>
<td>1</td>
<td>0.088</td>
<td>NS</td>
</tr>
<tr>
<td>SOPs</td>
<td>3.005</td>
<td>1</td>
<td>0.083</td>
<td>NS</td>
</tr>
</tbody>
</table>

SOPs, standard operating procedures; NS, not significant.

**Conclusions**

From the results study, the chef’s nutritional knowledge is still inadequate based on the survey conducted, even though the results of assessing the attitude towards chef’s nutrition are quite good. These results imply that chefs also need additional nutrition education, such as nutritional training activities. Even though many chefs have sufficient levels of education and years of working experience, nutritional training can also provide more nutritional experience for chefs. Nutritional training content should be adapt-
ed to the needs of chefs in the kitchen to produce innovative healthy foods for consumers.

References

4. Abdulsalam NM. Application of an andragogical approach and experiential learning for teaching culinary nutrition to culinary arts students. Clemson University, South Carolina; 2015. Available from: https://tigerprints.clemson.edu/cgi/viewcontent.cgi?article=2502&context=all_dissertations.
25. Kerrison D. Pilot study of a budget-tailored culinary nutrition education program for undergraduate food science students. Clemson University, South Carolina; 2014.