



Food safety knowledge, optimistic bias and risk perception among food handlers in institutional food services



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ARTICLE INFO

Article history:

Received 29 June 2016

Received in revised form

8 September 2016

Accepted 9 September 2016

Available online 10 September 2016

Keywords:

Food handler

Training

Food safety

Optimistic bias

Risk perception

ABSTRACT

Food handlers demonstrate an awareness of food safety but generally fail to translate that knowledge into safe practices. Optimistic bias can explain this phenomenon. Optimistic bias is a psychological phenomenon in which people believe they are less likely to experience adverse events than others. In this case, optimistic bias can negatively influence food safety. This study aims to verify the existence of optimistic bias and associated factors in food handlers who work in institutional food services. A total of 200 food handlers from 23 establishments in the state of Sao Paulo, Brazil, were recruited for this study. A structured questionnaire was used to determine the socio-demographic profile of food handlers and their frequency of training, food safety knowledge and risk perception. The food handlers indicated the risk of themselves and their peers causing a foodborne disease. Responses were provided on a structured seven-point scale ranging from highly unlikely (1) to extremely likely (7). The difference between their levels of risk perception indicated an optimistic bias. Most food handlers were female (73%) and trained (95%). The average knowledge score in food safety was 67%. Optimistic bias was identified in all situations studied, i.e., regardless of the parameter of comparison (internal or external peer) or the type of labor (generic or specific practice). Knowledge was higher in the group with a high education level ($p = 0.02$) but was not related to training, age or optimistic bias. An overly optimistic food handler can overlook some protocols and contaminate the food. Foodborne disease in institutional food services can lead to significant financial losses for the company due to absenteeism and reduced productivity.

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1. Introduction

Consuming meals away from the home is motivated by the pursuit of the speed and convenience of eating (Adams et al., 2015; Bezerra, Souza Pereira & Sichieri, 2013; Kant & Graubard, 2004). In Brazil, 62.7% of meals eaten outside of the home are consumed in the workplace (Carús, França, & Barros, 2014). This high number of meals, approximately 20 million per day in Brazil (ABERC, 2015), is due in part to the Worker Food Program (WFP). WFP is a Brazilian

public policy initiative that encourages companies to provide a balanced diet for workers, with the goal of reducing nutrition-related diseases and absenteeism and improving productivity. In return, the companies that join this program receive tax deductions (Bandoni, Brasil, & Jaime, 2006; Brasil, 1991).

Concern about the quality of meals provided to employees spans nutritional aspects and food safety, particularly with regard to preventing foodborne disease (FBD). Promoting food safety in establishments that produce meals must be based on a food safety management system that relies on the involvement of leadership, good communication, team commitment and the promotion of a safe environment in which everyone understands the risks of each procedure (Griffith, Livesey, & Clayton, 2010). Properly managing human resources is an important step in producing safe meals for consumption (Griffith, 2006; Jevšnik, Hlebec, & Raspor, 2008).

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Food handlers have an important role in the prevention of foodborne disease (FBD) (Brasil, 2005a). The inadequate handling of food is a major cause of foodborne outbreaks in Brazil (Lima, Loiko, Casarin, & Tondo, 2013) and other countries such as New Zealand (ESR, 2008, p. 28), the USA (Food and Drug Administration, 2009) and Hong Kong (Chan & Chan, 2007). Training food handlers in food safety is one of the most effective strategies for preventing FBD and is mandatory in Brazil (Brasil, 2004b) and other countries (McIntyre, Vallaster, Wilcott, Henderson, & Kosatsky, 2013; Regulation EC, 2004).

Studies have shown that training improves the knowledge of food handlers (Da Cunha, Stedefeldt, & de Rosso, 2014a,b; Liu et al., 2015; Soares, García-Díez, Esteves, Oliveira, & Saraiva, 2013). A relationship between knowledge and practice, however, is not always observed (Da Cunha, Braga, Passos, Stedefeldt, & Rosso, 2015; Da Cunha, Stedefeldt, & de Rosso, 2014b; Park, Kwak, & Chang, 2010; Soares et al., 2013). Everyday barriers such as time constraints, lack of communication, inadequate resources and ineffective leadership are considered important limitations (Rowell, Binkley, Alvarado, Thompson, & Burris, 2013) that lead the food handler to neglect good practices. One possible explanation for this is optimistic bias (OB) in food handlers (Da Cunha et al., 2015; Da Cunha, Stedefeldt, & Rosso, 2014a), whose practices are influenced by the environment in which they work (Da Cunha et al., 2014b). However, this hypothesis has not been tested for food handlers working in institutional food services, which can promote OB when the technical manager is a nutritionist (Brasil, 2005b), when most requirements for sanitation are met (Akutsu, Botelho, Camargo, Sávio, & Araújo, 2005) and when a large number of meals are produced (ABERC, 2015).

OB is a psychological phenomenon in which people believe they are less likely to experience negative events and more likely to experience positive events than others. For example, consumers believe that there is no possibility of suffering a FBD by consuming food in an apparently clean restaurant (Weinstein, 1989). OB appears as a communication barrier; people ignore risk messages as they believe that the message is directed to more vulnerable people, reducing their cautions to risk (Da Cunha et al., 2014a; Miles & Scaife, 2003). Weinstein (1989) presents some hypotheses for why this phenomenon occurs: self-protection; a desire to be better than others; threatened self-esteem; an illusion of control; and a low perception of risk. All of these habits are produced by cognitive errors.

The presence of OB in food handlers can be reflected in their negligence to good handling practices, jeopardizing the health of those who eat the meals they produce. In Brazil, the WFP provides meals for 20 million workers every day during working hours. Taking into account important aspects about food handler and worker health, this study aimed to identify the presence of OB in food handlers working in collective institutional food services and evaluate the possible associated factors.

2. Methods

2.1. Samples

A pilot test was performed with 20 food handlers to calculate the sample size and evaluate their understanding of the questionnaire. Calculation of the sample size estimated an expected correlation of 0.75 of OB with training variables (number of trainings and months since the last training) and knowledge of good handling practices. Based on this data, it was determined that it would be necessary to recruit 136 food handlers to obtain a sampling error of 0.15, given a 95% confidence interval.

Two hundred food handlers from 23 small- and medium-sized

institutional food service establishments that serve between 500 and 2000 meals per day, respectively (Pinheiro Sant'Ana, 2012), participated in this study. The establishments were selected for convenience and were located in cities in the metropolitan region of São Paulo, Brazil. The management of these establishments was either self-managed (food service managed by the company itself) or outsourced (food service managed by an outside company). Employees of these establishments who came into contact with food at any stage of processing were invited to participate. No restriction of experience was applied.

2.2. Questionnaires

A structured questionnaire collected the food handlers' socio-demographic information, work experience, information related to training, knowledge and risk perception related to food safety.

Upon arriving at the establishment, the interviewer invited the food handlers to answer the questionnaire in the cafeteria during a break in meal service. The interviewer was present to answer questions about the questionnaire and supervised the food handlers to make sure that no one exchanged information while answering the questionnaire. The response time ranged from 10 to 20 min; the interviewer then collected the questionnaire. To reduce response bias, the interviewer warned the handlers before answering the questionnaire that anonymity was guaranteed and that the company would not have access to individual responses.

2.2.1. Evaluation of knowledge

A questionnaire based on the study of Da Cunha et al. (2014b), with 10 multiple-choice questions and three response options (yes; no; I do not know), was used to evaluate the food handlers' knowledge of proper food handling practices. The main issues addressed included temperature control, cross contamination, personal hygiene and food safety. The questions were prepared based on the current legislation of food safety in São Paulo, Brazil, CVS-5 (São Paulo, 2013). The score for this questionnaire ranged from 0 to 10 and was subsequently converted to a percentage of correct responses.

2.2.2. Risk perception of foodborne diseases and OB

The handlers were asked about the risk of FBD caused by their practices while working. These 11 questions were based on the Handbook of Good Practices for Foodservice of the National Health Surveillance Agency (ANVISA in Portuguese) (Brasil, 2004b).

The handlers provided their answers on a structured seven-point scale ranging from "not at all likely (1), likely not to happen (2 and 3), 50% chance of happening (4), likely to happen (5 and 6) and extremely likely (7)". These questions were based on other studies on OB (Perloff & Fetzer, 1986; Raats, Sparks, Geekie, & Shepherd, 1999).

- Question 1 – What is the customer's risk of having stomach ache and/or vomiting (food poisoning) after eating a meal prepared by a food handler similar to you (who is a similar age and has participated in the same amount of training as you), but working at another company?
- Question 2 – What is the customer's risk of having stomach ache and/or vomiting (food poisoning) after eating a meal prepared by you?
- Question 3 – What is the customer's risk of having stomach ache and/or vomiting (food poisoning) after consuming a meal prepared by a colleague (food handler working in the same place as you)?
- Question 4 – If a customer consumes contaminated food, what is the risk of the disease he contracts being severe or lethal?

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