

Organizational factors and safe food handling by food service workers: a scoping review protocol

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ABSTRACT

Objective: The objective of this scoping review is to explore and map the scientific evidence on organizational factors related to safe food handling by food service workers to prevent foodborne disease.

Introduction: According to the World Health Organization, more than 600 million people become ill each year due to foodborne diseases. Improper food handling is one of the main causes of such diseases. Despite the growing literature on safe food handling, many studies focus on assessing and discussing cognitive variables, such as food safety knowledge. This indicates a need to study this topic from a new perspective, for example, through its organizational factors.

Inclusion criteria: The review will include quantitative and qualitative studies on food handlers (ie, individuals who have direct or indirect contact with food during their professional duties) working in food services (ie, institutional or commercial establishments). Food handlers involved in industrial processing, planting, harvesting, or working on the street (street food) or in the home will be excluded. Eligible studies will explore the organizational factors of safe food handling that influence employee behavior regarding food production.

Methods: This review will use the JBI methodology for scoping reviews to identify published and unpublished studies in all languages, with no date limit. The following databases will be searched: Scopus, CINAHL, Embase, Web of Science, MEDLINE, PsycINFO, and Food Science and Technology Abstracts. A structured search for gray literature will also be conducted. Titles, abstracts, and full texts of articles will be screened by 2 independent reviewers for inclusion, with discrepancies resolved by a third reviewer. Data will be extracted using a standardized form. The results will be summarized in tabular or graphical format, accompanied by a narrative summary.

Key details of this review project are available in Open Science Framework: <https://osf.io/hxfe4>

Keywords: behavior; food safety; foodborne disease; food service; hygiene practice

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Introduction

Food is essential for the development of the body and life.¹ It is the right of human beings to have access to adequate food, which is known as the human right to adequate food. According to the Food and Agriculture Organization of the United Nations, in

addition to nutritional adequacy and food safety, the dimensions of adequate food include diversity, access to information, respect for and appreciation of food culture, and access to financial or natural resources.²

In modern times, the human right to adequate food is increasingly converging with the concept of food security.² This concept originated in Europe during World War I, and was strengthened in the 1970s. It is defined as the availability and continued access to sufficient food for a healthy life.³ Food

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security is only achieved when all people have physical, social, and economic access to adequate, nutritious, and safe food to meet their needs and make food choices.⁴ However, even if all other dimensions of adequate food are achieved, if the foods are not safe for consumption, they can lead to disease instead of promoting health.¹ Thus, food safety refers to producing safe food, namely, food that does not harm the consumer and is free from physical, chemical, or biological hazards.⁵

It is estimated that 600 million people worldwide become ill and 420,000 die each year from food-borne diseases (FBDs), resulting in 33 million disability-adjusted life-years.⁶ According to the World Health Organization, more than 200 diseases are caused by consuming food contaminated with viruses, bacteria, parasites, and chemicals. Such hazards can cause diarrhea, vomiting, cancer, and even death.⁷ In addition to its impact on health, FBDs also affect the economy. According to a World Bank report, low- and middle-income countries lose USD \$95 billion per year as a result of FBDs, while the cost of treating FBDs is estimated at USD \$15 billion per year.⁸

Among the general factors associated with FBDs are globalization and the increase of air travel, which shrink distances and may facilitate outbreaks. In addition, there is a trend to eat more meals away from home, both in commercial and institutional settings, which may contribute to an increase in FBDs.⁹

Commercial food service is primarily focused on the market and maximizing profit. This service originated in the Middle Ages when it was a matter of feeding travelers in taverns and inns. Commercial food service has evolved and diversified to include restaurants, hotels, cafeterias, fast food restaurants, catering companies, and others.¹⁰ Institutional food service (eg, in non-commercial or on-site settings) emerged during industrialization, when factories began opening cafeterias so that their employees could have a place to eat. Institutional food services are defined as facilities that provide meals in places such as schools, universities, private institutional and corporate cafeterias, and nursing homes.¹⁰

Although the growing, harvesting, processing, and selling of food (retail) has critical steps in ensuring the safety of food, most outbreaks result from improper food handling practices, particularly in the food service industry.¹¹ Improper food handling can transform previously safe food into unsafe food.¹²

Thus, when an active failure occurs, a safe ingredient or ready-to-eat food can be contaminated by cross-contamination.¹³ It is also possible that foods contaminated during cultivation or processing may be rendered harmless through appropriate handling, such as thorough cooking.

Unsafe food handling is one of the main factors in FBD outbreaks.¹⁴ The most common factors reported in outbreaks with known causes were improper cooking, cross-contamination, and improper storage.¹⁵ Traditionally, the most important strategy for changing employee behavior and preventing FBDs has been to train food handlers.¹³ This strategy is recognized and cited in foundational food hygiene texts such as the Codex Alimentarius and the U.S. Food and Drug Administration's Food Code.¹⁶ However, there is insufficient evidence on the direct effectiveness of training as a means of improving food handling practices.¹⁷ Therefore, many researchers have addressed the limitations of this theory,^{18,19} given that not all knowledge translates into appropriate practices because of various cognitive and organizational factors.¹⁹

New strategies for food safety management have been developed because other variables are known to play a role,¹⁸ including food safety culture,²⁰ motivation and job satisfaction,²¹ leadership,²² organizational climate,²¹ and working conditions in terms of demands and resources.²³ In this regard, Da Cunha states that the first step toward safer food production is recognizing that organizational issues affect food safety performance.¹⁸ The organizational context refers to an appropriate internal environment that allows employees to develop and achieve successful practices. Thus, if employees are placed in a favorable organizational environment, they can develop appropriately and reach their full potential.²⁴ Similarly, if the food service provides a favorable environment for the production of safe food and encourages employees to follow required behaviors, they will understand that the organization creates an organizational climate that is conducive to food safety practices.²²

Organizational climate refers to employees' shared perceptions of their organization and their work environment.²⁵ A study by Ko and Kang found that the influence of food service organizational climate on employees' adherence to safe food production behaviors was significantly positive.²² Another organizational variable that has been

examined in studies in the restaurant industry is leadership.²⁶ Leadership is conceptualized as a relationship of mutual influence between the leader and the led, in which the needs of both parties are considered.²⁷ In another study conducted in the restaurant industry, a positive correlation ($r = 0.53$; $P < 0.01$) was found between empowering leadership by the supervisor and employee engagement at work. Based on this finding, it was determined that type of leadership may be an important associated factor in employee engagement in the food service industry.²⁸

Although there is ample evidence on how psychosocial factors influence safe food production in the food service industry, little is known about organizational factors. Organizational factors are attributes, processes, or operating conditions of an organization, including its philosophy, team resources, administrative support, and culture.²⁹ Examples of organizational factors that may influence employee behavior include leadership, peer support, social support, performance feedback, work hours, work pressure, job insecurity, and task conflict.^{13,18–23}

In this context, mapping the literature through a scoping review can help in the development of assertive strategies for food safety. An example of this is the European Commission document (Regulation 2021/382),³⁰ which included the concept of food safety culture as a mandatory element in food services. This inclusion was based on novel findings about organizational culture and food safety. Identifying how organizational factors interact with food safety management systems encourages the inclusion of such elements into policies, regulations, certifications, and new studies. Therefore, this review seeks to identify the organizational factors that have been studied in relation to safe food handling by food service workers. We performed a preliminary search of MEDLINE, CINAHL, Cochrane Database of Systematic Reviews, *JBI Evidence Synthesis*, and PROSPERO and did not find any current or ongoing scoping or systematic reviews on this topic.

Review questions

- i) Which organizational factors have been studied in relation to safe food handling by food service workers?
- ii) What are the types of food services described in the literature in the food safety field?

- iii) What are the most commonly described functions of food service workers in the food safety field?
- iv) What are the knowledge gaps in the literature reviewed?
- v) Which instruments, indicators, and constructs are used to measure organizational factors related to safe food handling by food service workers?

Inclusion criteria

Participants

This scoping review will consider studies with participants who are food handlers. Food handlers are defined as individuals who come into direct or indirect contact with food in the course of their professional duties, such as cooks, chefs, junior cooks, kitchen assistants (a professional who helps prepare food by, for example, weighing ingredients, or cutting and seasoning meat and vegetables), warehouse stockists (wrapping, date-labeling, and storing food items), dishwashers, waiters, dietitians, managers, and others who work in commercial or institutional food services. The review will exclude food handlers involved in industrial processing, planting, harvesting, or working on the street (street food) or in the home. The age of the food handler will not be considered as an inclusion criterion.

Concept

This scoping review will include all evidence that explores the organizational factors of safe food handling as well as the instruments, indicators, and constructs used for this assessment. We will consider studies that report on organizational issues that influence, are associated with, or drive employee behavior or performance in food production, such as food safety culture, job crafting, leadership, work engagement, workplace resources and demands, workplace norms, and occupational stress.

Context

The context of this scoping review is food services, which can be understood as the management units where all the technical and administrative activities (planning, organization, direction, execution, and evaluation) necessary for the production of meals are developed, until their distribution to healthy and sick collectivities. Thus, these food services

include all establishments where meals are prepared outside the home and in larger quantities (ie, both institutional and commercial). Typically, commercial food establishments do not have a steady customer base, and the number of patrons fluctuates. Examples of commercial food services include restaurants, hotels, bars, delicatessens, and catering companies. Institutional food services in this study are those where food preparation is only a complementary part of the central aspect of the establishment; therefore, profit is generally not their primary goal. Institutional food services often have a consistent number of patrons and a menu focused on health (eg, in schools, hospitals, nursing homes, support houses, non-profit institutions such as Meals on Wheels, correctional facilities). Studies will not be limited by geographical location.

Types of sources

This review will consider primary quantitative studies, including experimental and quasi-experimental studies. In addition, analytical observational studies, including prospective and retrospective cohort studies, case-control studies, and cross-sectional studies, will be considered. We will also consider narrative, systematic, and meta-analytic review articles and guidelines that meet the inclusion criteria. Finally, qualitative studies such as case studies, and designs containing interviews and focus groups, will also be included.

Methods

The proposed scoping review will be conducted in accordance with the JBI methodology for scoping reviews³¹ and reported in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR).³² Key details of this review project are available in Open Science Framework: <https://osf.io/hxfe4>.

Search strategy

The search strategy will follow 3 steps to find published and unpublished studies. First, we conducted an initial search, limited to MEDLINE and CINAHL, to identify the most relevant studies on the topic, their descriptors, and keywords in the title and abstract. The articles selected through this search listed the main databases and platforms used by researchers

on the topic of interest. Second, we used free and indexed terms contained in the titles and abstracts of the relevant articles to develop a complete search strategy for MEDLINE (PubMed), in collaboration with 2 librarians (see Appendix I). This search strategy will be customized for each database or information source, including all keywords and indexed terms. Third, we will review the reference lists of all included primary sources for additional studies.

Other databases to be searched will include Scopus, CINAHL (EBSCOhost), Embase, Web of Science, PsycINFO, and Food Science and Technology Abstracts (EBSCOhost). Gray literature will be searched for in the Networked Digital Library of Theses and Dissertations, the Brazilian Digital Library of Theses and Dissertations, the Theses and Dissertations Catalogue, the British Library EThOS, and the DART-Europe E-Theses Portal.

The review will examine all evidence, with no language or date limitations. Studies written in languages not spoken by the authors will be translated with the help of software and forwarded to professional translators if necessary.

Study/Source of evidence selection

Following the search, all identified citations will be grouped and uploaded into EndNote v.20 (Clarivate Analytics, PA, USA), and duplicates removed. After a pilot test, the identified titles and abstracts will be assessed by 2 independent reviewers against the inclusion criteria. We will retrieve full texts that meet the inclusion criteria and citation information and import these into the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI; JBI, Adelaide, Australia).³³

Two independent reviewers will evaluate the full texts against the inclusion criteria. Reasons for exclusion of full-text sources that do not meet the inclusion criteria will be recorded and reported in the scoping review. Any disagreements that arise between the reviewers at any stage of the selection process will be resolved through a third reviewer. The results of the search and the inclusion process of the studies will be reported in full in the scoping review and presented in a PRISMA flow diagram.³²

Data extraction

Two independent researchers will extract data from included studies using a data extraction tool

provided in Appendix II. Two reviewers tested this form on 10 sources to compare the collected data and verify their compatibility. This data extraction tool will be modified if necessary while extracting data from the included sources. Any changes made will be detailed in the scoping review.

The extracted data will include specific information on study identification (title, authors, country, language), study location (eg, school, hospital, company, restaurant, hotel), methods (research design, data collection instrument), population, study objectives, and main conclusions on organizational factors. A third reviewer will resolve any disagreements that arise between the reviewers.

Data analysis and presentation

The selected studies will be mapped and synthesized. Their results will be presented using graphs and tables to summarize the evidence and the existing gaps. The categories used to present the data will be the same as those in the data extraction tool. The results will be accompanied by a narrative summary describing how the results relate to the objective and questions of this review. The 2 researchers who performed the data extraction will also write the narrative summary. The other researchers will review the results.

All identified organizational factors will be summarized in a table, including details on the instruments, indicators, construct variables, scales, and scores used. A descriptive section will explain the types of food services and the most commonly described functions of food service workers. Graphs and tables will be used to present absolute and relative frequencies of food services and workers' characteristics. Research gaps will be summarized in the narrative summary and factors related to appropriate food safety practices will be discussed. Food safety practices will be measured by risk scores, compliance percentages, violation percentages, or self-reported practices.

Author contributions

LGPN: conceptualization; search strategy; methodology; writing: original draft; writing: review & editing. SMBF: conceptualization; search strategy; methodology; writing: original draft; writing: review and editing. FGL: search strategy; methodology; writing: review and editing. JT: search strategy;

methodology; writing: review and editing. VAAP: conceptualization; writing: original draft; writing: review and editing. AMCS: conceptualization; search strategy; writing: review and editing. DTC: conceptualization; search strategy; methodology; writing: original draft; writing: review and editing.

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Appendix I: Search strategy

MEDLINE (PubMed)

Search performed on May 9, 2022 and updated on March 06, 2023.

Search	Query	Records retrieved
1	(“Food Services”[MeSH Terms] OR “Food Services”[Text Word] OR “Food Services”[All Fields] OR (“Restaurants”[MeSH Terms] OR “Restaurants”[Text Word] OR “Restaurants”[All Fields] OR “restaurant”[Text Word] OR (“restaurants”[All Fields] OR “Restaurants”[MeSH Terms] OR “Restaurants”[All Fields] OR “restaurant”[All Fields])) OR “catering services”[All Fields] OR (“food service, hospital”[MeSH Terms] OR “Hospital Food Services”[All Fields] OR “Hospital Food Service”[All Fields]) OR (“Hospital catering”[All Fields] OR “institutional food services”[All Fields] OR “commercial food services”[All Fields] OR (“kitchen”[All Fields] OR “kitchens”[All Fields]) OR “feeding services”[All Fields] OR “food establishment”[All Fields])) AND (“Food Handling”[MeSH Terms] OR “Food Handling”[All Fields] OR “Food Processing”[All Fields] OR “food behaviors”[Text Word] OR “food handlers”[Text Word] OR “food handler”[Text Word] OR “food worker”[Text Word] OR “food workers”[Text Word] OR “cook”[Text Word] OR “chef”[Text Word] OR “waiter”[Text Word] OR “dietitian”[Text Word]) AND (“Food Safety”[MeSH Terms] OR “Food Safety”[All Fields] OR “safety food”[Text Word] OR “safe food”[Text Word] OR “safety feed”[Text Word] OR “food hygiene”[Text Word] OR (“Foodborne Diseases”[MeSH Terms] OR “Foodborne Diseases”[All Fields] OR “Foodborne Illnesses”[All Fields] OR “food-borne illnesses”[All Fields] OR “food borne illnesses”[All Fields] OR “food borne disease”[All Fields] OR “food-borne disease”[All Fields] OR “foodborne disease”[All Fields] OR “food borne illness”[All Fields] OR “food-borne illness”[All Fields] OR “Foodborne Illness”[All Fields] OR “food borne diseases”[All Fields] OR “food-borne diseases”[All Fields] OR “Food Poisoning”[All Fields] OR “Food Poisonings”[All Fields]))	1172
There were no language or date limitations on the search.		

Appendix II: Draft data extraction tool

Date:	
Reviewer:	
Article identification number:	
Components extracted	Response
Title of study	
Date of study	
Date of publication	
Author(s)	
Geographical region where study was conducted	
Language in which study was published	
Study citation	
Type of publication: (peer-reviewed, gray literature)	
Type of study	
Aims/questions of the study	
Form of recruitment of study participants	
Function/role • Junior chef • Head chef • Kitchen porter • Cook • Dishwasher • Stockist • Waiter • Manager • Dietitian • Other	
Organizational factors evaluated • Food safety culture • Leadership • Development opportunities • Job crafting • Organizational climate • Task conflict • Work pressure • Work hours • Work overload • Job insecurity • Peer support • Supervisor support • Performance feedback • Other	

(Continued)	
Date:	
Reviewer:	
Article identification number:	
Components extracted	Response
Type of food service • Institutional food service - School - University - Company - Hospital - Nursing home - Support house - Non-profit institution - Correctional facility - Other • Commercial food service - Restaurant - Hotel - Bar - Delicatessen - Cafeteria - Catering company - Other	
Instrument(s) or method(s) used to evaluate the organizational constructs • Checklist • Survey • Observation • Interview	
Instrument(s) or method(s) used to evaluate food safety performance • Checklist • Survey • Observation • Interview • Microbiological analysis of food or surfaces	
Results found • In the evaluation of food safety performance • In the evaluation of organizational factors • In the relationship between the organizational constructs investigated and the behavior or practice of the handler in producing safe food	
Gaps identified by the article	
Additional notes	