Assessing food safety culture in food-manufacturing: A review of applicable determinants and tools

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Introduction

Maintaining food hygiene in high yield food manufacturing environments requires considerable management and skill. A single food handler is typically thought to implement up to 2000 food-related actions every day and so the potential for mistakes along the gate-to-plate chain are many. Despite progress in developing comprehensive food safety management frameworks (e.g. HACCP, quality management systems), the perpetual burden of foodborne-related illnesses persists.1

Consequently, it is widely acknowledged that the maturity of an organisation’s prevailing food safety culture may account for the failure in systems designed to manage food production safety2. Food handler beliefs, attitudes and perceptions can influence behaviour in as much as organisational characteristics (such as food safety values, commitment or leadership), influence the production realm in which food handlers operate3.

Numerous studies have explored and assessed food safety culture across the food industry, but few are exclusive to food manufacturing. Consensus on one assessment method, classification system, single definition or definitive determinants have yet to be agreed. While this offers a broad spectrum of valuable knowledge, inconsistency can also lead to confusion; notably food manufacturing operators proactive in their efforts toward making positive safety culture change. To date, a review of these components and their applicability to food manufacturing has yet to be conducted.

The purpose of the study was to conduct a review of literature to identify: definitions, determinants, methods and tools available for food safety culture assessment and to assess their applicability to a food manufacturing operation.

Methods

Data Collection: Online databases identified primary food safety culture (FSC) research studies published between 2008 and 2018 which met the pre-devised inclusion/exclusion criteria.

Data capture: Relevant articles were uploaded to NVivo qualitative data analysis software and coded to a predefined code framework (FSC tools, sectors, definitions, determinants, theories, sub-systems and methods).

Ethical Approval: Approval was obtained from the Health and Food, Ethics Panel at Cardiff Metropolitan University (Ref PGR648).

Purpose

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Figure 1: Research method by type (n=42)

Food safety culture definitions

"Culture" definitions were referenced in 36 studies (either in combination from multiple disciplines or as a stand-alone concept). From organisational and safety domains, the most frequently cited (32%) were attributed to Schein4 and Hофштадт3. Food safety specific definitions included the work of academicians Йванна5 and De Bock et al(19). However, the most frequently cited definition across the dataset is attributed to the work of Griffith et al24, referenced in 73% of papers. This is given as:

“The aggregation of the prevailing, relatively constant, learned, shared attitudes, values and beliefs contributing to the hygiene behaviours used within a particular food handling environment.”

An intentional definition (as above) offers a simple statement for organisations to communicate the premise of food safety culture which is comprehensible at any level in any food operation.

Figure 2: Theories and models underlying study design (n=41)

Food safety culture attributes

The interpretation of food safety culture attributes are many. Determinants were categorised by the element most frequently associated with its dimensional context. In Figure 3, determinants associated with ‘people’ (cognitive and societal) were assessed more often (57%) than those associated with technical or organisational ‘systems’ (43%). While the distribution is relatively even overall, system elements are essential to support determinants associated with people, and quality and content should be analysed to ensure food safety culture expectations can be met.

Figure 3: Food safety culture attributes by % distribution (n=41)

As illustrated in Figure 4, determinants across the data-set varied significantly in terminology and associated classification. Those highlighted in bold [below] most frequently.

Significance of study

This review highlights that while many studies have evaluated food safety culture in whole or in part, few are exclusive to food manufacturing. Further work to validate and corroborate current methods in this field would enable deeper understanding of factors that influence organisational characteristics.

Triangulation provides a comprehensive assessment of food safety culture; however, the methods are time-consuming and elaborate. Demonstrating positive improvement through performance measurement (for example in food safety behaviours) following assessment would add further credibility and momentum to this developing research field.

Determinants assessed as an indication of food safety culture maturity vary greatly across this research field. Aligning terminology and classifications with guidance available to industry (such as the Global Food Safety Initiative’s ‘Food Safety Culture’ Position Paper)25 may propel efforts; ultimately towards a common goal.

References


