# A Content-Analysis of Professional Food-Handler Cognitive and Behavioural Food Safety Research Data. Lauren Wallis<sup>1</sup> and Ellen W. Evans<sup>2\*</sup>





<sup>1</sup>Cardiff School of Sport and Health Sciences, Cardiff Metropolitan University, Cardiff, United Kingdom.
<sup>2</sup>ZERO2FIVE Food Industry Centre Food and Drink Research Unit, Cardiff Metropolitan University, Cardiff, United Kingdom.

\*Corresponding author: elevans@cardiffmet.ac.uk





# Introduction

Foodborne illness is a growing concern across the world; it is estimated that 600 million people fall ill after eating contaminated food every year

A significant contributing factor to foodborne illness can be the food safety practices of the food handler (2). Most food produced in the world today is produced within industry by the food handler; therefore, there is a need to have a clear understanding of the food handlers cognition and behavioural practices (3).

Currently, there is limited research data available within the food manufacturing industry and the main source of research seems to be from within the catering sector (4).

In addition, there has been selective previous secondary reviews completed within this field but again, predominantly within the catering

The need for further research to be conducted from within the food manufacturing industry is evident, particularly focusing on observational data to confirm self-reported practices of the food handler.

# Purpose

The purpose of this study was to conduct a content-analysis of published research papers detailing professional food-handler's knowledge, attitude, self-reported practices and observed behaviours in relation to key food safety principles within food environments.

# Methods

Data Collection: An electronic search of previously published food safety related research papers was conducted. Inclusion and exclusion criteria was determined prior to the search commencing.

Data Capture: Identified professional food handler food safety research papers were reviewed and any relevant findings regarding food safety principles were captured using a pre-designed Qualtrics database created by the Food Industry Centre at Cardiff Metropolitan

Ethical Approval: Ethical approval was obtained by the University prior to the commencement of data collection, (reference: UG-1264).

# Results

#### Location and setting of data collection

A total of 100 published food safety related research papers detailing cognitive and/or behavioural food handler food safety data were identified, reviewed and analysed for this secondary review. The papers spanned from 1999-2019 but the majority of the papers were published within the last decade, 2009-2019, (n=72).

As indicated in Figure 1, a total of 43 countries were included within the review. Malaysia was the country in which the majority of the studies were based (11%), followed by Brazil (8%), India (6%) and Turkey (6%). Countries less frequently used for data collection included China (2%), Ghana (2%), Kenya (2%) and Romania (2%). The United Kingdom was the country of data collection for 4% of the food handler food safety studies, indicating an international

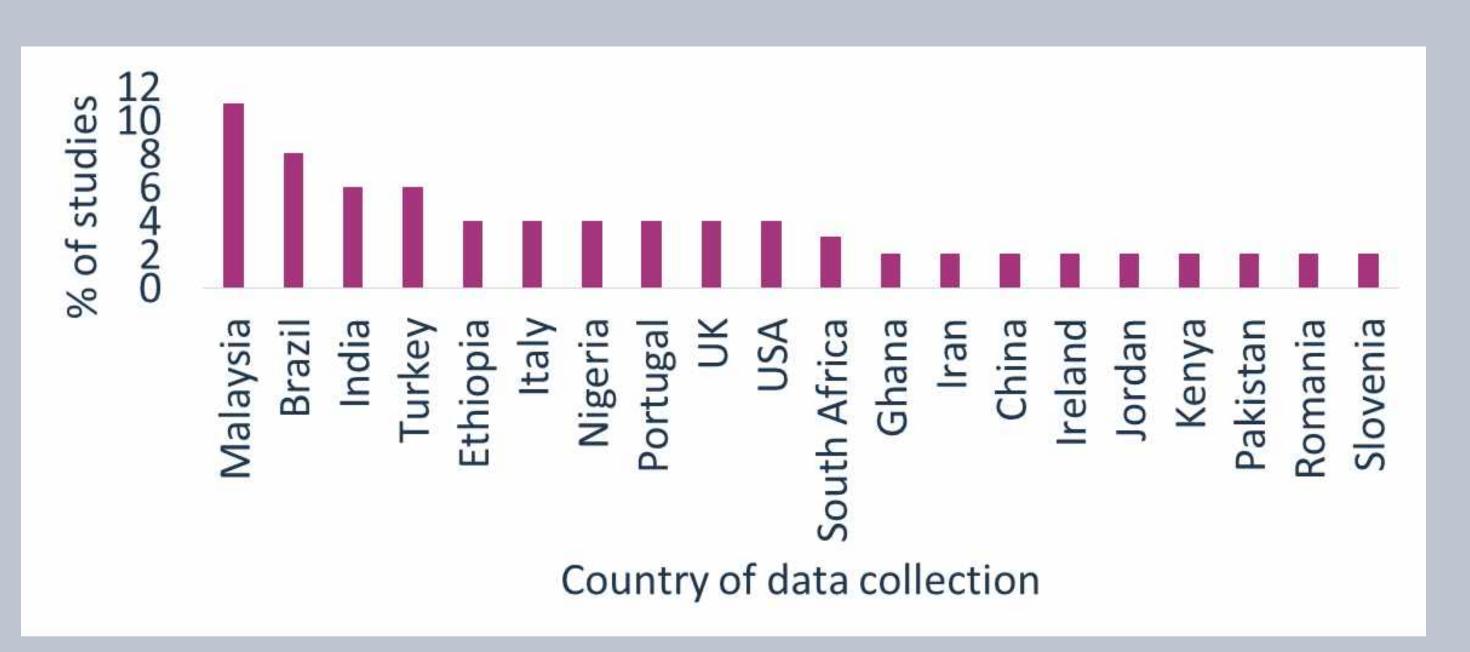


Figure 1: Food safety studies reviewed by country (*n*=100).

The setting of the food handler food safety research settings was captured within five categories, as shown in Figure 2. The "Catering" category was the setting for the highest amount of food safety research (25%). High-risk food service (e.g. hospitals and schools) was the setting for 24% of the research papers, followed by food vendors (19%) (Figure 2).

Data from the food manufacturing industry were lacking with only 13% of the studies collecting data from within this sector.

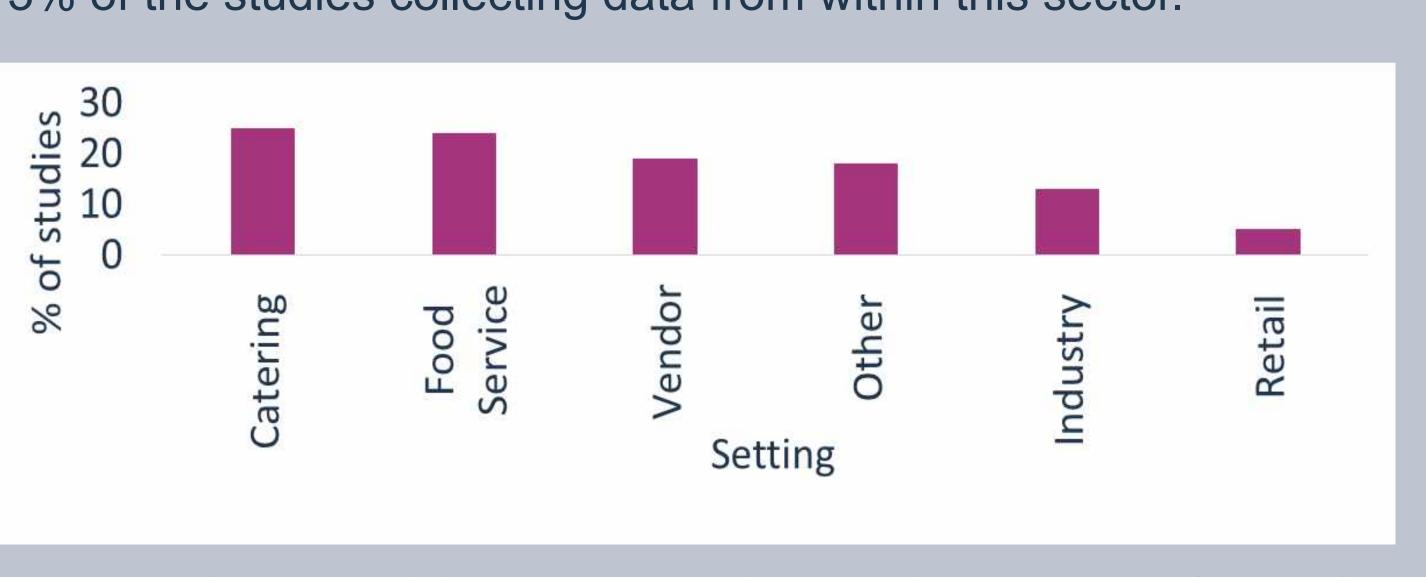


Figure 2: Setting of food handler food safety studies (*n*=100).

#### Research methods utilised in studies

A range of methods were used for data collection within the research papers, the most common used was a self-complete questionnaire which was used in 54% of the food handler food safety studies, this was followed by interviews (50%).

As show in Figure 3, observation (30%) and focus groups (2%) were less frequently used methods.

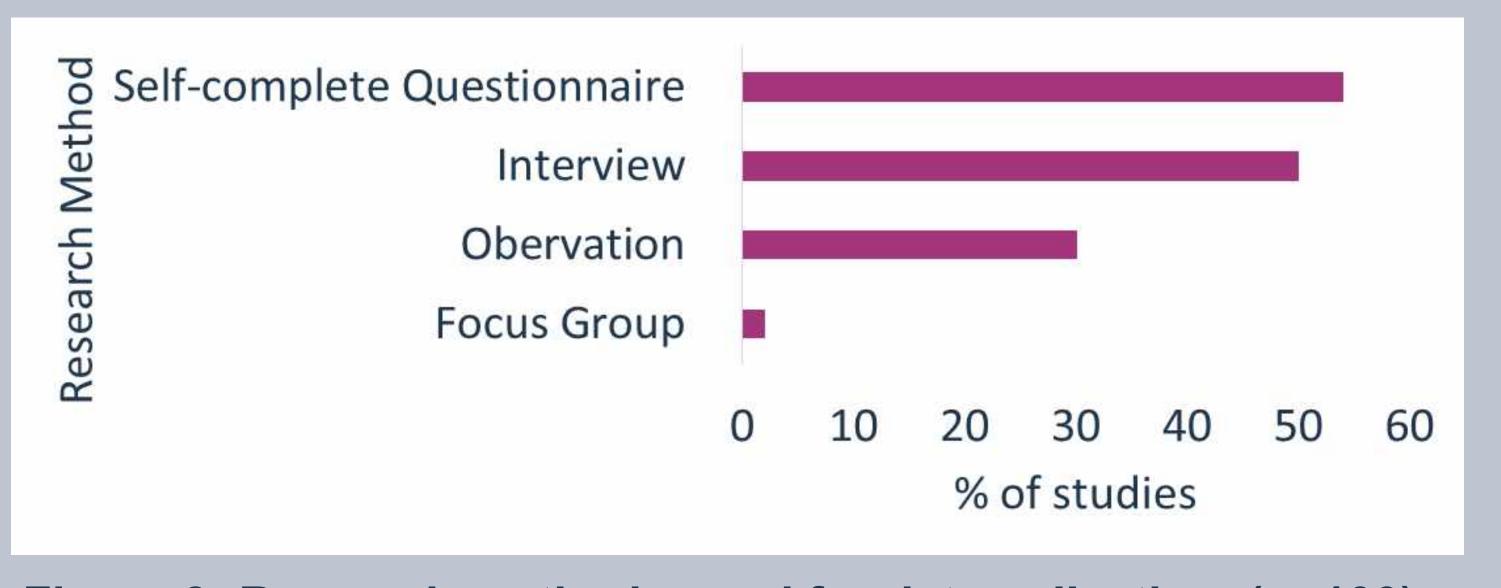


Figure 3: Research methods used for data collection, (n=100).

### Research measures reported in studies

As survey based methods were most frequently utilised, the research measures most commonly reported in the reviewed food handler food safety studies related to cognitive measures.

Knowledge was the most common research measure captured within the foodhandler food safety studies (75%), this was followed by self-reported practices (48%) and attitudes (39%).

Observed behaviour (30%) and microbiological analysis (10%) were less frequently reported as indicated in Figure 4.

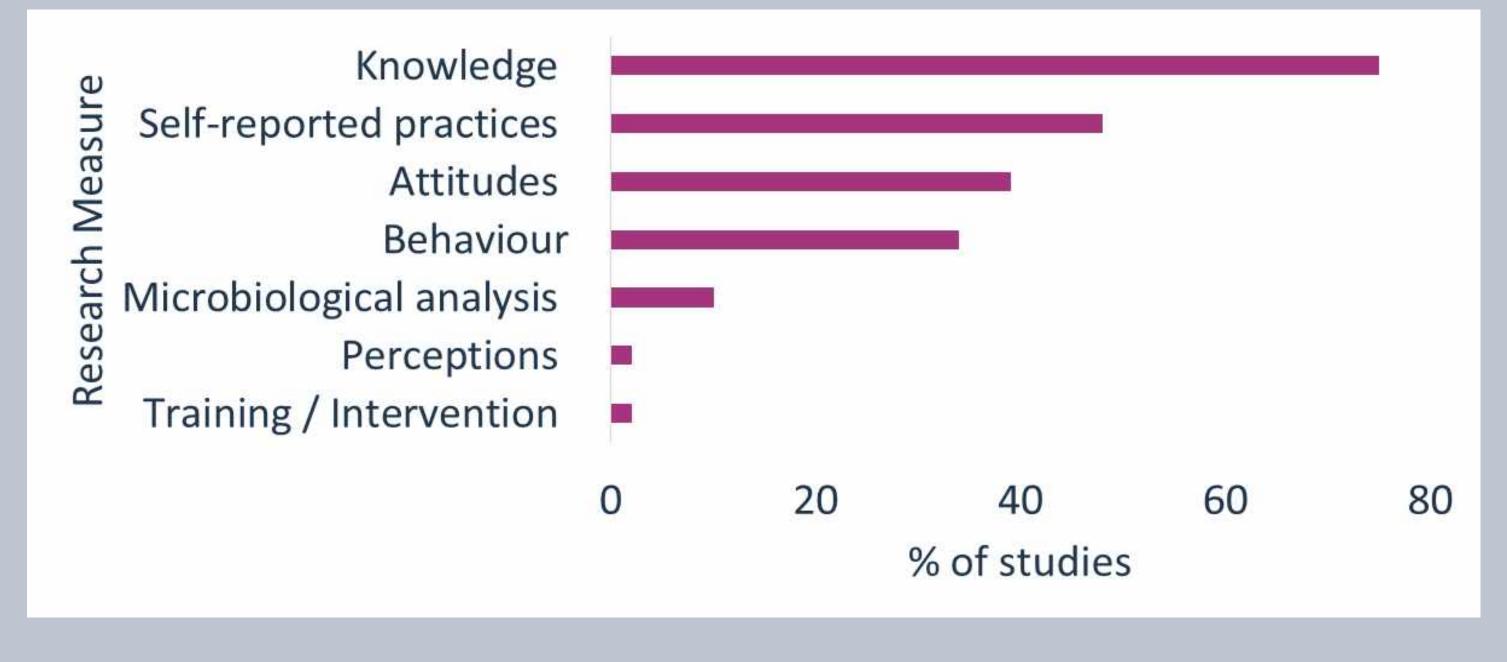


Figure 4: Research measures reported in food handler food

#### Reported food safety practices

The most commonly included food safety practice within the food handler research studies included in the review was hand hygiene which was included in all of the reviewed studies (100%). This was closely followed by cross-contamination (97%), cleaning (90%), Personal Protective Equipment (PPE) (81%) and cooking (70%). As indicated in Figure 5, the less frequently included food safety practices included food storage (61%).

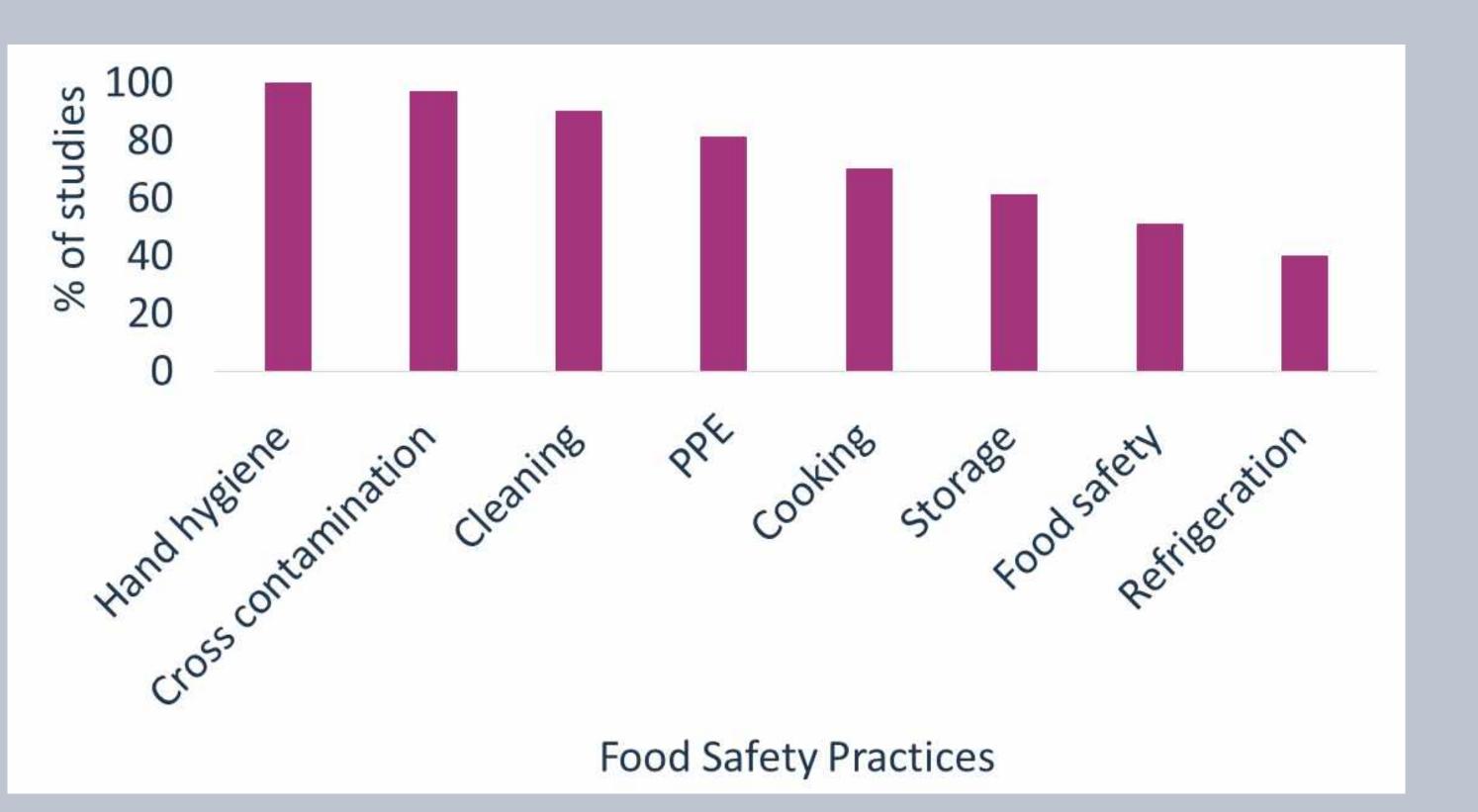


Figure 5: Food safety practices most commonly included within review, (n=100).

Comparison of the food safety practices showed potential inconsistencies as a result of the research measures used in studies (Table 1); for example cognitive data suggested food handlers were aware and reported to implement the correct hand washing technique, however observational data indicated widespread malpractices. This is linked to the bias associated with self-reported data and shows the value of observational data.

Table 1: Key findings with regards to hand hygiene and crosscontamination from the research papers, (n=6).

	Knowledge	Attitude	Self-reported	Observed
Hand Hygiene	95% knew that washing hands with only water is not clean enough (7).	93% believed hand washing to be important (8).	89% reported to always practicing proper hand washing procedures (6).	100% didn't wash hands using the proper technique (6).
Cross- Contami- nation	18% said that the same cutting board can be used for raw and cooked foods if it looks clean (9).	20% believed in using different knives for raw and cooked foods (9).	22% reported to mixing containers for raw and cooked food (10).	9% did not sepa- rate areas for raw and cooked food during the prepara tion process (11).

# Significance of study

- Completion of this review has identified that the majority of food handler food safety data currently available is from within the catering sector and that there is a lack of information from the food processing and manufacturing industry.
- Secondly, the potential disconnect between cognitive and behavioural data has been demonstrated, suggesting foodhandlers are aware of recommended practices but fail to adhere to and follow recommendations..
- Furthermore, there is a lack of observational data detailing food handler food safety practices.

## Recommendations

Completion of this study has established the need for further observational research from within the food manufacturing industry to understand food handler behaviour, such findings may be utilised to inform the development of effecting training and educational interventions that facilitate behaviour change, not only knowledge

# References

- 1. World Health Organisation, 2019. Food Safety. [Online]. Available at: https://www.who.int/news-room/facty [Accessed 20 February 2020].
- 2. Food Standards Agency, 2018. Food hygiene for your business The 4Cs of food hygiene. [Online]. Available
- 3. McFarland, P., Sielaff, A, C., Rasco, B., & Smith, S., 2019. Efficacy of Food Safety Training in Commercial Food Service. Journal of Food Science, Volume 84 (6), pp. 1239-1246.
- 4. Smigic, N., Antic, D., Blagojevic, B., Tomasevic, I., & Djekic, I., 2016. The level of food safety knowledge among meat handlers. British Food Journal, Volume 118 (1), pp. 9-25.
- 5. Thaivalappil, A., Waddell, L., Greig, J., Meldrum, R., & Young, I., 2018. A systematic review and thematic synthesis of qualitative research studies on factors affecting safe food handling at retail and food service. Food Control, Volume 89, pp. 97-107.
- 6. Tan, S, L., Bakar, F, A., Karim, M, S, A., Lee, H, Y., & Mahyudin, N, A., 2013. Hand hygiene knowledge, attitudes and practices among food handlers at primary schools in Hulu Langat district, Selangor (Malaysia). Food Control, Volume 34, pp. 428-435.
- 7. Shuvo, D, S, 2018. Assessing Food safety and associated food hygiene and sanitary practices in food industries: a cross-sectional study on biscuit industry of Bangladesh. Nutrition & Food Sciences, Volume 48 (1). 8. Iwu, A, C., Uwakwe, K, A., Duru, C, B., Diwe, K, C., Chineke, H, N., Merenu, I, A., Oluoha, U, R., Madubueze, U, C., Ndukwu, E., & Ohale, I., 2017. Knowledge, Attitude and Practices of Food Hygiene among Food Vendors in Owerri, Imo State, Nigeria. Occupational Diseases and Environmental Medicine, Volume 5, pp. 11-25. 9. Fariba, R., Gholamreza, J, K., Saharnaz, N., Ehsan, H., & Masoud, Y., 2018. Knowledge, attitude, and practice among food handlers of semi-industrial catering: a cross sectional study at one of the governmental organizations in Tehran. Journal of Environmental Health Science and Engineering, Volume 16 (2), pp. 249-256. 10. liu, S., liu, Z., Zhang, H., Lu, L., Liang, J., & Huang, Q., 2014. Knowledge, attitude and practices of food safety amongst food handlers in the coastal resort of Guangdong, China. Food Control, Volume 47, pp. 457-461. 11. Vo, T, H., Le, N, H., Le, A, T, N., Minh, N, N, T., & Nuorti, J, P., 2015. Knowledge, attitudes, practices and training needs of food-handlers in large canteens in Southern Vietnam. Food Control, Volume 57, pp. 190-194.