A Comparison of Hand Hygiene Compliance in High-Care and High-Risk Areas in a Welsh Food Manufacturing Business Using Covert Observation. Ellen W. Evans, Catherine Bunston and Elizabeth C. Redmond. ZEROTWENTYFIVE Food Industry Centre Food and Drink Research Unit, Cardiff Metropolitan University, Cardiff, United Kingdom. 2Cardiff School of and Health Sciences, Cardiff Metropolitan University, Cardiff, United Kingdom. *Corresponding author: eevans@cardiffmet.ac.uk

Introduction

Hand hygiene is one of the most effective methods for preventing cross-contamination. Food handlers have a major role in the prevention of foodborne illness during food production, consequently food-hand hygiene failures are frequently reported to be implicated in foodborne illnesses.

Although informative, food safety cognitions are not indicative of actual practice and may be subject to bias; therefore food handlers may demonstrate awareness of food safety, however may fail to translate knowledge into safe practices. For this reason observational data are superior to survey data.

However, during direct observations, researcher presence can increase subject reactivity, whereas covert video observation provide a more comprehensive analysis over a sustained period, where familiarity reduces reactivity bias.

Previous video observation research has assessed food handler behaviours at retail/catering settings. However, this method has been under-utilised in food manufacturing business environments.

Covert observation may allow the comparison of practices in different areas of manufacturing over the same time period.

Purpose

To evaluate and compare food handler compliance with company hand hygiene protocol in two production areas of a manufacturer and supplier of sweet and savoury ready-to-eat food products to wholesale, retail, food service and catering establishments in the UK.

Methods

• Twenty-four hours worth of closed circuit television (CCTV) footage from two pre-production hand hygiene areas in a food manufacturing business was obtained.

• Footage from the point-of-entry hand hygiene facilities in high-risk (salad area) and high-risk (sandwich area) production areas were reviewed and assessed using an electronic behavioural checklist to evaluate compliance with company protocol using a specifically designed Qualtrics database.

• Recorded data included; duration, occurrence (exit/entry), gender, role (food handlers/hygiene/engineering), personal protective equipment (PPE), observed malpractices, procedure adequacy and compliance.

• Descriptive analysis and inferential statistics were conducted using a Microsoft Excel database and IBM SPSS Statistics package 23.

Acknowledgements

The ZEROTWENTYFIVE Food Industry Research Group wish to acknowledge the food manufacturing business that participated in the study and allowed access to on-site footage.

References


2. Trott E, Greig JD, Birtalan CA, Michaelis BL. Outbreaks Where Food Workers Have Been Implicated in the Spread of Foodborne Disease. Part 5 Factors Contributing to Outbreaks and Description of Outbreak Categories. J Food Prot. 2007; 70:1009-27.


Results

Attempts to implement hand hygiene

Despite the business having CCTV cameras throughout the facilities, they were seldom used to assess hand hygiene practices, cameras were used for security and would be infrequently used in the event of an incident.

A total of 403 occurrences of food handlers passing through the two production hand hygiene areas were observed; 203 entering production, 200 exiting production.

As indicated in Figure 1, of these 47 instances were food handlers entering high-risk production where cakes and ready-to-eat pies are manufactured and 233 instances were food handlers entering high-risk production were sandwiches and salads are produced.

On 3 occasions, food handlers were observed failing to implement hand hygiene practices prior to entering the production areas. No significant differences were determined in failing to attempt hand hygiene practices were determined between high-risk (P=0.9) and high-risk (P=0.05).

All subsequent analyses focus on the observed attempts to implement hand hygiene practices prior to entering the two production areas (n=187).

Figure 1. Hand hygiene attempts according to occasion, area and compliance (n=403)

Hand hygiene compliance with company protocol

The practice of pushing squeezes up 3 inches above the wrist prior to commencing handwashing (as described in the company protocol) was observed to be significantly more frequently (p<0.005) in the high-risk hand hygiene area (24%) compared to high-care hand hygiene areas (9%).

No further significant differences were determined in observed hand hygiene attempts or compliance (p>0.05) in the two pre-production hand hygiene areas.

As indicated in Table 1, although <99% utilised soap, only 56-69% washed hands first, before applying soap and 76-95% failed to push-up squeezes prior to commencing handwashing.

Failure to rub all parts of hands was widespread (87%) and 24-35% failed to apply sanitizer after completing hand washing.

Consequently >98% of observed food handler attempts prior to entering the two production areas were not compliant with company protocol.

Table 1. Significant differences in observed hand hygiene practices prior to entering the two production areas

<table>
<thead>
<tr>
<th>Area</th>
<th>Compliance attempt (n=403)</th>
<th>No attempts (n=403)</th>
<th>Complete attempt (n=403)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-care production</td>
<td>56%</td>
<td>27%</td>
<td>17%</td>
</tr>
<tr>
<td>High-risk production</td>
<td>69%</td>
<td>9%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Hand hygiene duration

The company protocol stated that the duration of hand washing should take 20 seconds or longer. Observed hand washing duration ranged from 1-71 seconds. However, 93-96% of hand washing attempts in the two areas had durations shorter than the specified 20 seconds. Shorter hand washing durations were more frequently observed in the pre-production hand hygiene area of high-care (Figure 2).

Although hand washing attempts in neither area were significantly more likely (p<0.05) of having durations that complied with the company protocol. Significant longer (p<0.05) hand washing durations (Median=11 seconds, Interquartile range=144) were observed in high-risk hand hygiene, (Median=9 seconds, Interquartile range=3-21440; U=373, x<0.01,n=0.25).

Furthermore, significant longer hand washing durations were observed when in the presence of others (Median=12 seconds, Interquartile range=108) than when the person attempting hand washing was alone (Median=9 seconds, Interquartile range=81) (U=2912; z=-4.896, p<0.001, r=0.33).

Significance of study

• Video-observation data has provided an in-depth insight into hand-hygiene compliance when entering production and thus illustrated a valuable and useful resource for the business. Findings indicate awareness of the need to implement hand hygiene practices however the importance of which may be underestimated.

• Despite different food handlers working in the two separate areas of the company, extensive hand hygiene malpractices were observed in both that were contrary to company protocol, which may compromise food safety during production. Findings suggest the need for bespoke training to inform food handlers of the most effective method of hand hygiene.

• Further research is required to explore the potential cognitive, technical, societal and organisational factors that may influence staff motivation and ability to adequately implement hand hygiene practices.