

A Comparison of Hand Hygiene Compliance in High-Care and High-Risk Areas in a Welsh Food Manufacturing Business Using Covert Observation.

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Introduction

Hand hygiene is one of the most effective method for preventing cross-contamination. Food handlers have a major role in the prevention of foodborne illness during food production¹, consequently food handler hand hygiene failures are frequently reported to be implicated in foodborne illness².

Although informative, food safety cognitions are not indicative of actual practices and may be subject to biases³, therefore food handlers may demonstrate awareness of food safety, however may fail to translate knowledge into safe practices⁴. For this reason observational data are superior to survey data⁵.

However, during direct observations, researcher presence can increase subject reactivity⁶, whereas covert video observation provide a more comprehensive analysis over a sustained period, where familiarity reduces reactivity bias⁷.

Previous video observation research have assessed food handler behaviours at retail/catering settings⁸⁻¹⁰, 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 period of time.

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 close 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-care (cake/pie production) and high-risk (sandwich/salad 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

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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 referred to in the event of an incident.

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

As indicated in Figure 1, of these; 47 instances were food-handlers entering high-care production where cakes and ready-to-eat pies are manufactured and 153 instances were food-handlers entering high-risk production where sandwiches and salads are produced.

On 13 occasions, food-handlers were observed failing to attempt implementation of hand-hygiene practices prior to entering the production areas. No significant differences ($p>0.05$) in failing to attempt hand hygiene practices were determined between high-care (9%) and high-risk (6%).

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

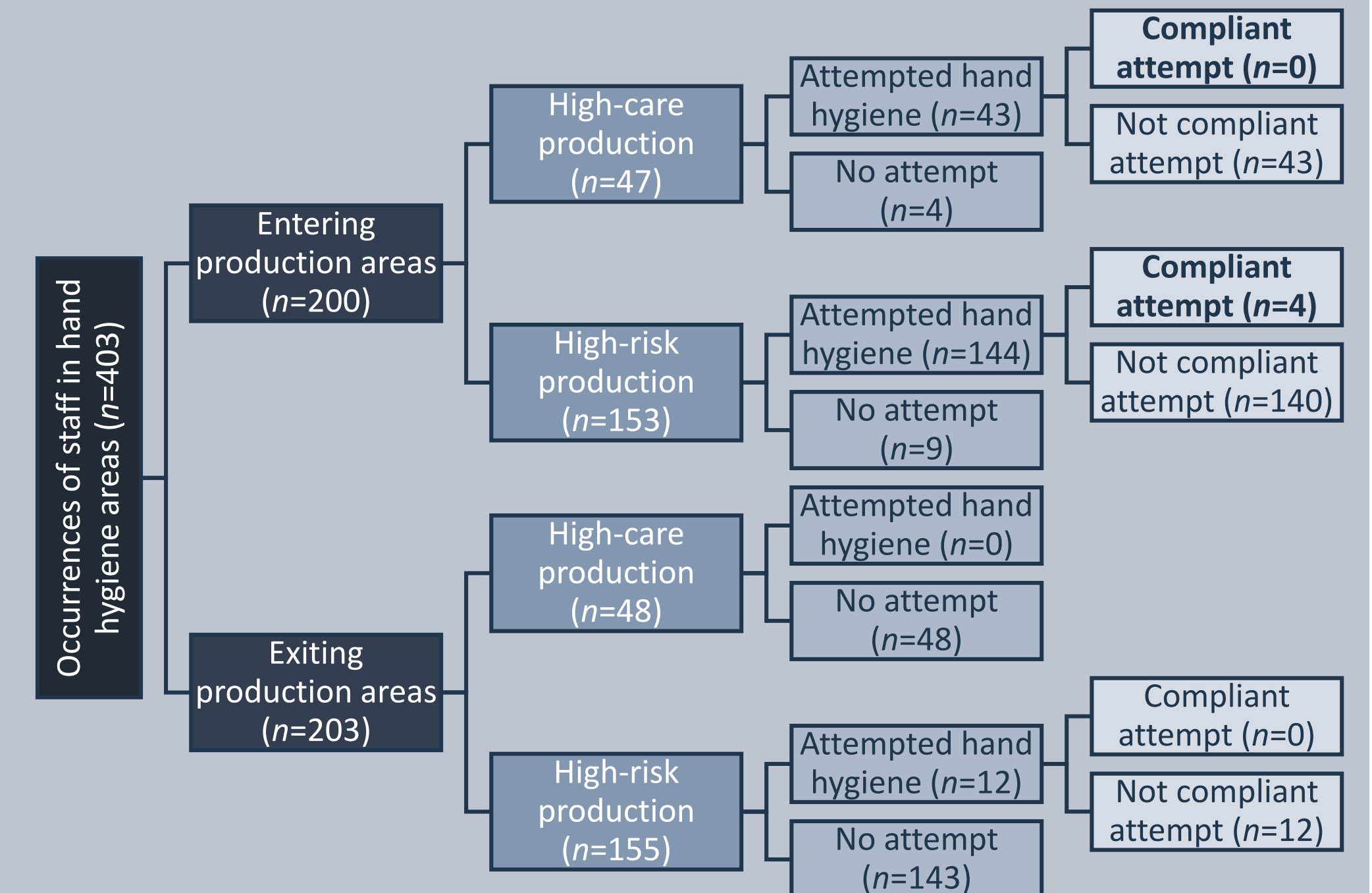


Figure 1. Hand hygiene attempts according to occasion, area and compliance (n=403)

Hand hygiene compliance with company protocol

The practice of pushing sleeves up 3 inches above the wrist prior to commencing handwashing (as described in the company protocol) was observed to be significantly more frequently ($p<0.005$) implemented in the high-risk hand hygiene area (24%) compared to high-care hand hygiene area (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% wetted hands first, before applying soap and 76–91% failed to push-up sleeves prior to commencing handwashing.

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

Consequently >98% of observed hand hygiene 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

Of attempts	High-care production (n=43)	High-risk production (n=144)	Statistical analysis
Push sleeves up 3 inches above the wrist	9%	24%	$\chi^2 (1, n = 187) = 4.516, p < 0.023, \phi = 0.155$
Wet hands with water first	56%	69%	$p > 0.05$
Wet hands after soap	44%	31%	$p > 0.05$
Apply soap	98%	99%	$p > 0.05$
Vigorous and various actions when lathering – rubbing all parts	23%	13%	$p > 0.05$
Dry with paper towel or hand drier	100%	99%	$p > 0.05$
Duration of hand washing >20 seconds	7%	4%	$p > 0.05$
Use of hand sanitiser	65%	76%	$p > 0.05$
Adequate attempts	2%	8%	$p > 0.05$
Attempts compliant with procedure	0%	3%	$p > 0.05$

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 ($Md=11$ seconds, $n=144$) were observed in high-risk than high-care ($Md=9$ seconds, $n=43$) ($U = 2214.0, z = -3.373, p < 0.001, r = 0.25$).

Furthermore, significant longer hand washing durations were observed when in the presence of others ($Md=12$ seconds, $n=106$) than when the person attempting hand washing was alone ($Md=9$ seconds, $n=81$) ($U = 2912.0, z = -4.896, p < 0.001, r = 0.35$).

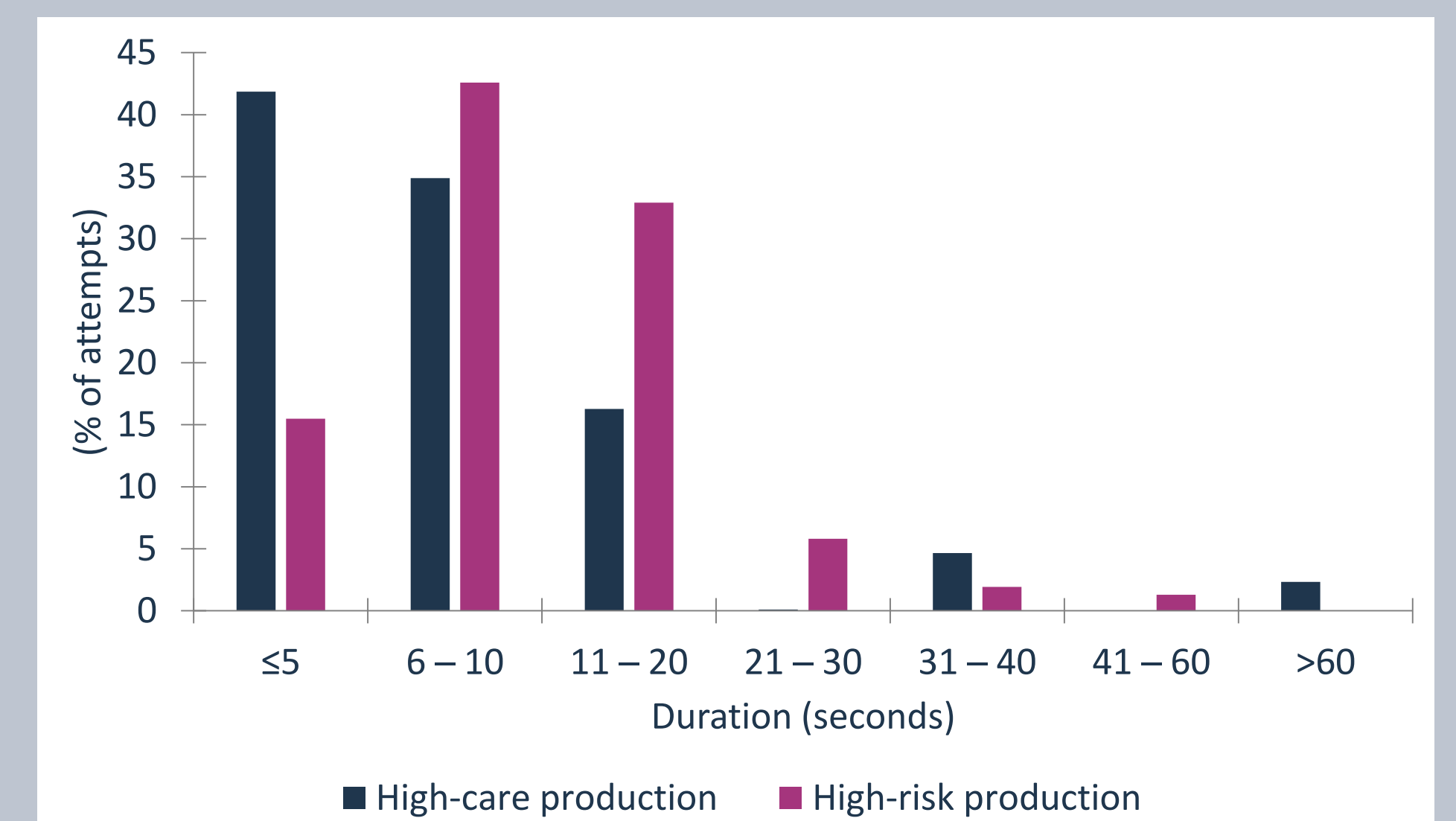


Figure 2. Frequency of observed hand washing duration prior to entering the high-care production area (n=43) and high-risk production area (n=144).

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 identified site-specific issues to improve practices.
- 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.