



Practice of hand hygiene in a university dining facility



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ARTICLE INFO

Article history:

Received 5 September 2014

Received in revised form

23 March 2015

Accepted 24 March 2015

Available online 2 April 2015

Keywords:

Foodborne diseases

Hand hygiene

Food handlers

University dining facility

ABSTRACT

The hand hygiene practices of food handlers at a university dining facility (UDF) before and after an educational campaign on hand hygiene were evaluated. The study was performed from June to December 2010, and employed an observation period of 4 h per day during the morning, afternoon and evening shifts, resulting in a total observation time of 543 h. A total of 1960 instances requiring hand hygiene were recorded. No instructions were provided to the food handlers during observations, and they had no knowledge of the study. The overall adherence rate was 11% (216/1960), with a rate of 7% (72/1060) before the educational campaign and 16% (144/900) afterwards ($P < 0.001$). However, the short duration of the follow-up period in the present study means the long-term effectiveness of the campaign remains uncertain. Rubbing of dorsal fingers, thumbs and fingertips, especially by kitchen assistants, were the most neglected steps of the technique. The average time spent on hand hygiene before and after the campaign, and its standard deviation, were 12.89 ± 7.25 s and 18.69 ± 13.72 s ($P < 0.0001$), respectively. The results revealed a low overall rate of adherence to hand hygiene, and a general failure to execute the technique. The educational campaign resulted in a significant increase in adherence to hand hygiene before handling food (8% versus 38%; $P < 0.001$). However, it did not result in increased adherence to hand hygiene during and after contact with food, suggesting that food handlers are not yet aware of the importance of hand hygiene in food preparation. Although the time spent on hand hygiene after the educational campaign increased significantly, it remained unsatisfactory. The time the food handlers spent on hand hygiene was slightly below the minimum recommended time of 20 s, except for the cook.

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1. Introduction

Hand hygiene is considered one of the most effective methods of preventing foodborne diseases because many of those diseases are caused by microorganisms transmitted by the contaminated hands of food handlers (Ali, Verrill & Zhang, 2014; Guzewich & Ross, 1999; Michaels et al., 2004; Todd, Greig, Bartleson, & Michaels, 2007). However, studies have shown that there is a low rate of adherence

to the recommended practices of hand hygiene by food handlers during food preparation (Allwood, Jenkins, Paulus, Johnson & Hedberg, 2004; Clayton & Griffith, 2004; FDA, 2000; Green et al., 2006; Robertson, Boyer, Chapman, Eifer, & Franz, 2013).

To protect the health of the population against diseases caused by consumption of contaminated food, sanitary authorities around the world have established rules and recommendations emphasizing hand hygiene to ensure hygienic-sanitary conditions in food handling (Brasil, 2004; FDA, 2009; WHO, 2006).

For example, the United States Food and Drug Administration (FDA) has established recommendations in their Food Code and included situations during food preparation in which the hands should be sanitized to prevent food contamination (FDA, 2009). The World Health Organization (WHO) also published the “Five Keys to Safer Food Manual” in which they emphasize the hand hygiene practices of food handlers before food preparation as well as during

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and after the entire handling process to prevent food contamination (WHO, 2006).

In Brazil, the Resolution RDC number 216 of the National Agency of Sanitary Vigilance (Agência Nacional de Vigilância Sanitária – ANVISA) provides for the technical regulation of sanitary practices for food services. The resolution also determines that food handlers must wash their hands thoroughly upon arriving at work, before and after handling food, after any work interruption, after touching contaminated material, after using the toilet and whenever deemed necessary. The resolution also establishes that posters should be posted in easy to view places, including the toilet and lavatories, to guide food handlers in the proper hand washing and antiseptics techniques, as well as other hygiene habits (Brasil, 2004).

A systematic study on the hand hygiene practices of food handlers was not found for Brazil; however, there are reports that food handlers rarely wash their hands when they enter the kitchen or during food preparation and that hand hygiene, when performed, is improperly executed (Almeida, Kuaye, Serrano, & Almeida, 1995; Andrade, Silva, & Brabes, 2003; Campos et al., 2009).

In the current study, we evaluated the hand hygiene practices (i.e., adherence to hand hygiene practice, technique execution, time and products used) of food handlers of a university dining facility before and after an educational campaign on hand hygiene.

2. Material and methods

2.1. Experimental design

We performed a direct prospective observational study to evaluate the hand hygiene practice, including the adherence to hand hygiene practices and execution of proper techniques, of the food handlers in a university dining facility before and after an educational campaign on hand hygiene. The current study was approved by the university's Ethics Committee in Research. The food handlers who participated in the training as volunteers signed a consent form, and the lecture and practical training lasted 4 h.

2.2. Study site

This study was carried out at a university dining facility (UDF) in the northwest of the state of Paraná. The UDF staff consists of 48 employees, including 4 cooks and 36 kitchen assistants, 4 internal security agents, 2 administrative technicians, 1 boiler operator and 1 nutritionist. During the study period, 2300 meals were produced on average per day, with 300 for breakfast, 1500 for lunch and 500 for dinner.

The area where the meals were produced in the UDF had two sinks for hand hygiene by the food handlers. One sink was located at the unit entrance, which had a dispenser for non-medicated liquid soap and an alcohol gel dispenser. The other sink was located in the meal preparation area (preparation of rice and beans), and it also had a liquid soap dispenser. The UDF dining area had six sinks for the hand hygiene of the consumers, with three at the "A" entrance and three at the "B" entrance. Each sink had paper towels, a dispenser for non-medicated liquid soap, dispenser for alcohol gel and poster that shows the proper hand hygiene technique. The taps were manual, without sensors. At the exit of the UDF, there was an alcohol gel dispenser.

2.3. Observational study

The direct prospective observational study was performed in the areas of pre-preparation, preparation and distribution of the UDF, including the following sectors: (i) preparation of meat, grains, fruits and vegetables; (ii) pre-preparation of coffee, rice, beans,

entrée, lunch boxes and juice; (iii) area where the food is temporarily stored after preparation and distribution. The population that was investigated in the current study consisted of cooks and kitchen assistants for a total of 40 food handlers. The current study was conducted from June to December 2010.

Adherence to the practice of hand hygiene and the execution of hand hygiene techniques by food handlers were evaluated in the following hand hygiene indication situations: (i) when the food handler arrived at work (kitchen), including areas of food pre-preparation, preparation and distribution; (ii) before and after food preparation; (iii) after any work interruption; (iv) after touching any body part except for the arms and hands; (v) after touching contaminated materials; and (vi) after using the toilets. The rate of adherence to hand hygiene was calculated by dividing the number of hand hygiene actions performed when an opportunity existed (i.e. hand hygiene indication) by the total number of hand hygiene opportunities.

The observation period was approximately 5 h per day, distributed during the morning, afternoon and night shifts and included the pre-preparation, preparation and food distribution sectors for a total of 543 h of observation. The time spent on hand hygiene and using the products were also recorded. During the observations, no instructions were given to the food handlers and they had no knowledge of the project.

2.4. Hand hygiene technique

The hand hygiene technique was considered adequate when the hands were rubbed over the palms, interdigital spaces, joints, fingernails, fingertips and wrists according to the technique recommended by the Ministry of Health of Brazil (Brasil, 2007). To evaluate the proper hand hygiene, the execution of the seven step technique was observed: (1) rubbing the palms of hands together; (2) rubbing of the right palm over the left dorsum with interlaced fingers and vice versa); (3) rubbing the palm of both hands together with the fingers interlaced; (4) rubbing the back of the fingers of one hand with the palm of the opposite hand (and vice-versa) and interlacing the fingers; (5) rubbing the right thumb with left palm (and vice-versa) using a circular motion; (6) rubbing the fingertips and fingernails of the left hand against the right palm (and vice-versa) using a circular motion; (7) rubbing the left wrist with the aid of the fingers and palm of the right hand (and vice-versa) using a circular motion (Brasil, 2007).

2.5. Hand hygiene before the educational campaign

The adherence to hand hygiene practices and execution of techniques by the food handlers were recorded by one of the authors of the present study (DBP) under the conditions described in section 2.3. The observational study was conducted from June 23 to October 26, 2010, and each observation period lasted for approximately 5 h per day and was distributed across the morning, afternoon and night shifts. The observations were performed in the pre-preparation, preparation and distribution sectors for a total of 343 h. The time spent on hand hygiene and using the products were also recorded.

2.6. Educational campaign on hand hygiene

On November 5, 2010, a lecture on the hand hygiene educational campaign was performed and the importance of hand hygiene, techniques and recommendations for hand hygiene in food service facilities was emphasized. Immediately after the lecture, a practical training program to illustrate the effect of hand hygiene in reducing the microbiota on hands was performed as described below.

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