

ORIGINAL ARTICLE

Hand Washing Compliance among Retail Food Establishment Workers in Cartagena de Indias, Colombia

Cumplimiento del lavado de manos entre trabajadores de establecimientos minoristas de alimentos en Cartagena de Indias, Colombia

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Article history:

Received 16 July 2020

Received in revised form 8 October 2020

Accepted 10 October 2020

Available online 11 December 2020

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ABSTRACT

Inadequate hand washing by food workers is an important contributing factor to foodborne disease outbreaks in retail food establishments (RFEs). We conducted a survey of RFEs to investigate the effect of hand washing training, availability of hand washing facilities, and the ability of the person in charge (PIC) to describe hand washing according to the Ministry of Health and Social Protection on workers' ability to demonstrate food code-compliant hand washing. Only 52% of the PICs could describe the hand washing procedure outlined in the food code, and only 48% of workers could demonstrate code-compliant hand washing. The most common problems observed were failure to wash for 20 s and failure to use a fingernail brush. There was a strong positive association between the PIC being a certified food manager and being able to describe the food code hand washing procedure (odds ratio [OR], 5.5; 95% confidence interval [CI], 2.2 to 13.7), and there was an even stronger association between the PIC being able to describe hand washing and workers being able to demonstrate code-compliant hand washing (OR, 15; 95% CI, 6 to 37). Significant associations were detected among correct hand washing demonstration, physical infrastructure for hand washing, and the hand washing training methods used by the establishment. However, the principal determinant of successful hand washing demonstration was the PIC's ability to describe proper hand washing procedure. These results suggest that improving hand washing practices among food workers will require interventions that address PIC knowledge of hand washing requirement and procedure and the development and implementation of effective hand washing training methods.

Keywords: Hand Washing, Retail Food Establishment, Colombia

RESUMEN

El lavado de manos inadecuado por parte de los trabajadores de alimentos es un factor importante que contribuye a los brotes de enfermedades transmitidas por los alimentos en los establecimientos minoristas de alimentos (RFE). Realizamos una encuesta de RFE para investigar el efecto de la capacitación en lavado de manos, la disponibilidad de instalaciones para lavarse las manos y la capacidad de la persona a cargo (PIC) para describir el lavado de manos de acuerdo con lo establecido por el Ministerio Colombiano de Salud y Protección Social sobre la capacidad de los trabajadores para que demuestre cómo lavarse las manos en conformidad con el código alimentario. Solo el 52% de los PIC pudo describir el procedimiento de lavado de manos descrito en el código de alimentos, y solo el 48% de los trabajadores pudo demostrar cómo lavarse las manos de acuerdo con el código. Los problemas más comunes observados fueron; no lavarse durante 20 s y no usar un cepillo de uñas. Hubo una fuerte asociación positiva entre el PIC ser un administrador de alimentos certificado y ser capaz de describir el procedimiento de lavado de manos del código de alimentos (razón de probabilidades [OR], 5,5; intervalo de confianza [IC] del 95%, 2,2 a 13,7), y hubo una asociación aún más fuerte entre el PIC puede describir el lavado de manos y los trabajadores pueden demostrar el lavado de manos que cumple con el código (OR, 15; IC del 95%, 6 a 37). Se detectaron asociaciones

significativas entre la demostración correcta de lavado de manos, la infraestructura física para el lavado de manos y los métodos de capacitación en lavado de manos utilizados por el establecimiento. Sin embargo, el principal factor determinante de una demostración exitosa de lavado de manos fue la capacidad del PIC para describir el procedimiento adecuado de lavado de manos. Estos resultados sugieren que la mejora de las prácticas de lavado de manos entre los trabajadores de la alimentación requerirá intervenciones que aborden el conocimiento de PIC sobre los requisitos y procedimientos de lavado de manos y el desarrollo e implementación de métodos efectivos de capacitación en lavado de manos.

Palabras clave: Lavado de manos, Establecimiento minorista de alimentos, Colombia.

INTRODUCTION

Foodborne diseases are a major public health problem in the world (13). Noroviruses are the leading known cause of foodborne illness and are increasingly recognized as the leading cause of outbreaks (1). Infected food workers may transmit norovirus and other foodborne pathogens by touching foods or food contact surfaces with contaminated hands (9, 10). According to the Centers for Disease Control and Prevention, poor personal hygiene is one of the five most common causes of foodborne disease outbreaks (19). Thus, proper and consistent hand washing must be practiced by all food workers to reduce the risk of disease transmission (5, 15, 17). The Ministry of Health and Social Protection (food code) specifies a hand washing protocol for food workers, which includes wetting the hands, applying soap, rubbing the hands together vigorously for at least 20 s, and rinsing with clean water (18). In addition to this, food workers in Cartagena are required to use a fingernail brush during hand washing to scrub areas underneath the nails and between the fingers (18). However, epidemiologic and inspection data show that there is low compliance with hand washing requirements among retail food establishment (RFE) workers (1, 19).

Public health agencies promote hand washing among food workers by requiring that appropriate hand washing facilities be provided in each RFE and that ongoing hand washing training is conducted (18, 20). Thus, all RFEs in Cartagena de Indias, Colombia must have fully equipped hand washing stations, and except for establishments with minimal food preparation, such as those that serve prepackaged food, all must have a state-certified food manager who is trained in safe food preparation, sanitation, and the prevention of foodborne illnesses. Additionally, there must be a designated person in charge (PIC) of a RFE at all hours of operation who is knowledgeable about foodborne disease risk factors, such as poor worker hygiene, and who is responsible for ensuring that appropriate measures are in place to prevent foodborne disease transmission.

Lack of hand washing facilities and ignorance of the health benefits associated with hand washing are important barriers to hand washing in the general

population (6, 7, 10, 16). However, the barriers to hand washing in RFEs are not fully understood.

Purpose of the study

We therefore conducted a survey of RFEs to investigate the relationship among hand washing training, the ability of the PIC to describe hand washing according to the food code, and the availability of appropriate hand washing facilities and workers' ability to demonstrate food code-compliant hand washing.

MATERIALS AND METHODS

Data were collected by sanitarians while conducting routine inspections of 123 RFEs. The surveyed establishments included restaurants, delis, bakeries, and grocery stores in 12 inspectional jurisdictions across Colombia. A standardized instrument was used to collect data for the study, and all participating sanitarians were trained to use the instrument before data collection began.

In each establishment surveyed, the PIC was asked if he or she was a state certified food manager. Then the PIC was asked to describe the hand washing procedure stipulated by the food code and to identify which if any of the following methods were used to conduct employee hand washing training: posted materials, training video, use of written training manual, explanation of hand washing requirement and procedure, demonstration of proper hand washing, training with employee sign-off, and/or comprehensive training with formal certification. After the PIC was interviewed, a food handler was asked to demonstrate hand washing according to the food code. Care was taken to select a worker who had not heard the hand washing description given by the PIC. A satisfactory hand washing description or demonstration had to include wetting the hands, lathering soap up to the wrist, rubbing vigorously for 20 s, using a fingernail brush, rinsing with clean water, and drying hands with a disposable paper towel. Following the demonstration, the evaluator conducted an inspection of the establishment's hand washing facilities to determine if they were accessible, supplied with water at a temperature of at least 43 °C (110 °F), and clean and if soap, disposable towels, and a fingernail brush were

present at the sink. Inspection of the hand washing facilities was performed after the hand washing demonstration to reduce the likelihood of bias. Statistical analysis of the data was performed with the Statistical Analysis System (SAS) software (SAS Institute, Cary, N.C.) and EpiInfo 2002 (Centers for Disease Control and Prevention, Atlanta, Ga.). The analysis of variance procedure was used to test associations among numerical variables, and associations among categorical variables were tested by χ^2 tests.

RESULTS AND DISCUSSION

Training methods

Most establishments provided some type of hand washing training to employees. The number of methods used for hand washing training ranged from no formal training in 14% of the establishments to six different methods in one establishment (Fig. 1). The most frequently reported method used for hand washing training was a verbal explanation of hand washing (Table 1). Among establishments that used only one method of training, demonstration and explanation were the most effective methods in that employees in RFEs that reported using either of these methods were two to three times more likely to demonstrate code-compliant hand washing than were employees who received no formal training (Table 2). However, the effectiveness of all training methods was dependent on the PIC’s ability to describe hand washing, and irrespective of the training method, 60 to 84% of workers could demonstrate hand washing when the PIC could describe hand washing and only 0 to 30% of workers could when the PIC could not describe the procedure. There was also a strong positive association between the number of hand washing training methods

and worker’s ability to demonstrate hand washing (χ^2 test for trend, P , 0.01) (Fig. 2).

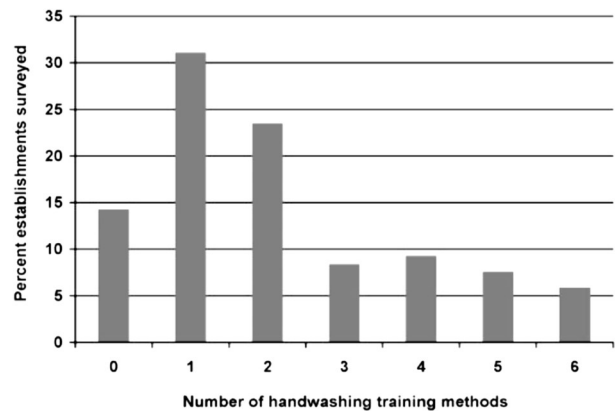


Figure 1. Hand washing training methods used in surveyed establishments. None of the establishments used all seven methods.

Figura 1. Métodos de formación sobre el lavado de manos utilizados en los establecimientos encuestados. Ninguno de los establecimientos utilizó los siete métodos

Table 2. Correct hand washing demonstrations by training method

Tabla 2. Demostraciones correctas de lavado de manos por método de capacitación

Training method	Fre- quency (%)	No. (%) correct hand washing		Rate ratio
		Yes	No	
Explanation	15	7 (47)	8 (53)	2.2
Demonstration	8	5 (63)	3 (37)	3.0
None	14	3 (21)	11 (79)	Reference
Signs and posters	7	2 (29)	5 (71)	1.4
Training manual	5	1 (20)	4 (80)	1.0
Video	2	0 (0)	2 (100)	0

For 37 establishments that reported using only one hand washing training method compared with 14 establishments that did no formal training. None of these establishments offered formal training with certification.

Table 1. Correct hand washing demonstrations by training methods used

Tabla 1. Demostraciones correctas de lavado de manos mediante los métodos de capacitación utilizados

Training method	Frequency (%) ^b	No. (%) correct hand washing		
		Yes	No	Rate ratio
Explanation	62	37 (60)	25 (40)	2.9
Demonstration	54	32 (59)	22 (41)	2.8
Signs and posters	41	18 (44)	23 (56)	2.1
Sign-off	30	19 (63)	11 (37)	3.0
Training manual	29	19 (66)	10 (34)	3.1
Video	23	12 (52)	11 (48)	2.5
None	14	3 (21)	11 (79)	Reference
Certificate	6	3 (50)	3 (50)	2.4

^aFor all establishments. ^bFifty-three percent of establishments reported using two or more training methods

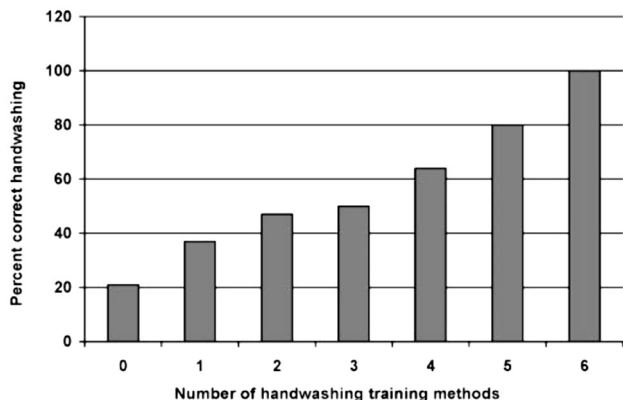


Figure 2. Percentage of correct hand washing demonstrations by number of training methods. None of the establishments used all seven methods.

Figura 2. Porcentaje de demostraciones de lavado de manos correcto por número de métodos de capacitación. Ninguno de los establecimientos utilizó los siete métodos.

Hand washing description

Only 52% of the PICs could describe the hand washing procedure outlined in the food code. The PICs who were state-certified food managers were more likely to be able to describe the food code hand washing procedure (48 [66%] of 73 compared with 8 [25%] of 32; odds ratio [OR], 5.8; 95% confidence interval [CI], 2.3 to 14.7). Failure to specify the need to use a fingernail brush was the most common problem with the hand washing descriptions given by the PICs. However, 77% of PICs who were state certified food managers described the need to use a fingernail brush compared with 38% of uncertified PICs (OR, 5.5; 95% CI, 2.2 to 13.7).

Hand washing demonstration

Only 48% of food handlers could demonstrate hand washing according to the food code. The most frequent problems with the hand washing demonstrations were failure to use a fingernail brush and failure to wash for 20 s. These problems were noted in 89 and 60% of incorrect hand washing demonstrations, respectively. The ability to demonstrate codecompliant hand washing was significantly associated with the PIC being able to describe hand washing (44 [76%] of 58 compared with 9 [18%] of 51; OR, 14.7; 95% CI, 5.7 to 36.5).

Hand washing facilities

Only 68 (55%) of the establishments surveyed were fully equipped for hand washing according to the food code. The most common problems with the hand

washing facilities were a lack of fingernail brush and inaccessibility of the hand sink. These problems were noted in 38 and 24% of the establishments, respectively. Hand washing facilities were more likely to be fully equipped in the establishments where a certified food manager was the PIC during the survey (45 [60%] of 75 versus 12 [38%] of 32; OR, 2.5; 95% CI, 1.1 to 6.3). A nailbrush was at the demonstration sink in 62% of establishments, elsewhere in the establishment in 21%, and completely absent in 17% of establishments. If the brush was at the sink it was used 86% (57 of 66) of the time, whereas if it was not at the sink it was used 7% (3 of 44) of the time (OR, 87; 95% CI, 22 to 339).

Poor hand washing by food workers is an important risk factor for foodborne disease outbreaks in RFEs (3, 7, 11, 14, 21). This includes the failure to both wash hands and wash hands correctly. Although we were not able to directly observe the frequency or adequacy of hand washing during routine foodservice operations, we believe that being able to demonstrate proper hand washing technique is a necessary condition for good hand washing practices and may be a useful indicator of likely hand washing compliance in RFEs (13, 17). Several important findings were made in this study.

Among them, we have shown that there is a strong association between the hand washing knowledge of the PIC and the ability of food workers to demonstrate proper hand washing. Assigning a person who is knowledgeable about operational and code requirements to be in charge of a RFE at all hours of operation is essential for ensuring the appropriate detection and resolution of food safety hazards (4).

However, under current Colombian food regulations, a PIC of a food establishment does not have to demonstrate achievement of food safety knowledge standards through testing and certification; thus, the food safety knowledge of individual PICs is highly variable. These results suggest that uncertified managers may lack the skills and/or inclination to ensure appropriate levels of compliance with hand washing by food workers; thus, a certified food manager may need to be present in high-risk RFEs during all hours of operation to help ensure acceptable levels of hand washing compliance.

Workers in establishments that conduct some type of hand washing training could more frequently demonstrate proper hand washing than workers in establishments that did no training. In addition, hand washing performance was directly proportional to the number of methods used to conduct hand washing

training. These findings reinforce the long-held belief that appropriate food safety education can help improve food safety performance in retail establishments (2, 4, 12). In particular, demonstration of hand washing technique and verbal explanations of hand washing appeared to be the most effective training methods when used alone. Both depend on personal communication with the food worker. In contrast, less personal methods, such as the use of training manuals, signs, posters, and videos, did not appear to be successful when used as the sole method. However, these materials may be important to reinforce the primary training. The increasing effectiveness of multiple methods of training also suggests that repeating the training messages in different ways may be important (8).

CONCLUSION

In conclusion, our results suggest that improving hand washing practices among food workers will require interventions that address PIC knowledge of hand washing requirement and procedure, physical facilities for hand washing, and the development and implementation of appropriate training methods. Personal communication with the food worker appears to be important for effective training and is very likely to be important for translating hand washing knowledge into routine practice.

Conflict of interest:

The authors declare that they have no conflict of interest.

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