



Knowledge, attitudes, practices and training needs of food-handlers in large canteens in Southern Vietnam



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ABSTRACT

Frequent foodborne outbreaks occurring in large canteens of factories and schools are a public health concern in Vietnam. Potential for contamination of food during the preparation phase has not yet been addressed by public health authorities, particularly the food-handlers' knowledge, attitudes and practices (KAP) regarding food safety. To identify training needs, we conducted an analytical cross-sectional study assessing KAP of food-handlers in large canteens of schools and factories in 2012. From a sampling frame of 169 large canteens (50 in schools and 119 in factories; a total of 3399 employees) in Southern Vietnam, 40 schools and 26 factories were selected on the basis of type of establishment; all food-handlers (N = 909) in the selected canteens were interviewed by using standard questionnaire. After descriptive analysis, potential confounders were controlled by using logistic regression models to calculate prevalence odds ratios (PORs) and 95% confidence intervals (CI) for differences in KAP between employees in schools and factories. A qualitative study of ten focus groups with participants selected by using maximum variation sampling was also conducted to identify training needs. Of the 909 food-handlers participating the study, 76% were females, 84% had secondary school or higher education; median age and work experience were 38 years and 36 months, respectively. Proportions of all participants whose KAP were considered adequate were 26%, 36%, and 26%, respectively. There were associations between knowledge and attitudes, and knowledge and practices. After controlling for gender, age, educational level, and length of work experience in logistic regression models, the odds of food-handlers in schools reporting adequate KAP were about twice as high as those for food-handlers in factories. Among 66 investigated canteens, 9% did not separate raw food from cooked food area and 52% did not have standard rest rooms. Food-handlers' suggestions for training needs included appropriate location of the training venue at the work place, involvement of managers, fewer trainees per course, more practical exercises, and longer course duration. KAP of food-handlers were generally poor, especially among food-handlers working in factories. Public health authorities in Vietnam should prioritize food-handlers in factories for training courses.

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1. Introduction

Food safety is one of the major public health concerns in Vietnam. From 2007 to 2012, a total of 1095 foodborne outbreaks, 36,404 cases, 28,277 hospitalizations, and 266 deaths were reported to the Vietnam Food Administration (Vietnam Food

Administration, 2011). Many of these outbreaks occurred in large canteens of schools and factories in industrial zones. The proportion of outbreaks with 30 or more cases accounted for 28% of the total number of outbreaks and 81% of the total number of reported cases during 2007–2010.

Contamination of food can occur anywhere along the chain from production, processing, and preparation to consumption. National authorities have issued guidelines to reduce contamination during the production and processing phase, but potential for contamination during the preparation phase has not been specifically

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addressed, particularly in terms of the food-handlers' knowledge, attitudes and practices (KAP) about food safety. An observational study conducted in Ho Chi Minh City in 2007 showed that 95% of food-handlers in public kitchens had inadequate knowledge and 88% of the food-handlers had improper food safety practices (Nguyen, Nguyen, & Le, 2010). In addition, outbreaks were reported to occur more frequently in factories in industrial zones than in schools (National Institute of Nutrition – United Nations Children's Fund, 2011; Vietnam Food Administration, 2011). The objectives of the study were to evaluate the current KAP of food-handlers in large canteens, to compare the KAP of food-handlers working in schools with those in factories, and to identify training needs customized for food-handlers in schools and factories in Southern Vietnam.

2. Material and methods

In 2012, an analytical cross-sectional study was conducted to assess KAP of food-handlers working in large canteens (defined as those serving > 500 meals a day) in three provinces where the industrial zones of Southern Vietnam are located (Ho Chi Minh City, Binh Duong and Dong Nai provinces). From a pooled sampling frame of 169 large canteens, we stratified the large canteens into two groups: those in schools ($n = 50$) and those in factories ($n = 119$). A sample size of 444 food-handlers in each group was calculated by using the following parameters: $p_1 = 0.6$, $p_2 = 0.5$, $\alpha = 0.05$, $power = 0.8$, $non-response\ rate = 10\%$ (Vietnam Food Administration, 2011). The required number of schools and factories was estimated by taking sample size of each group divided by its average number of food-handlers, resulting in 40 schools (444/11) and 26 factories (444/17). We then randomly selected 40 of 50 schools and 26 of 119 factories; all food-handlers in selected canteens were interviewed and their practices observed at the food-service establishments (McGinn, 2004).

The questionnaires were developed on the basis of current regulations and guidelines of the Ministry of Health (MOH) on food safety with adaptations from previous studies (Angelillo, Viggiani, Greco, & Rito, 2001; Askarian, Kabir, Aminbaig, Memish, & Jafari, 2004; Baş, Şafak Ersun, & Kivanç, 2006; Cuprasitrut, Srisorrachart, & Malai, 2011; Green et al., 2006; Lin & Sneed, 2003; Marais, Conradie, & Labadarios, 2008; Nee & Sani, 2011). The questionnaire had four parts. Part 1 collected demographic information. Part 2 included 19 questions on knowledge of foodborne diseases, personal hygiene, cross-contamination, cleanliness, safe raw materials and temperature control. Of the questions, 16 close-ended questions were scored from 0 to 1, and 3 multi-choice questions were scored from 0 to 3. Food-handlers who scored 50% or more of the maximum score (25) were considered to have adequate knowledge; a score of < 50% was considered inadequate knowledge. Part 3 included 10 likert scale questions on attitudes towards cleanliness, personal hygiene, raw and cooked food handling, safe raw materials and temperature control. These questions were graded from 1 (completely disagree) to 5 (completely agree). Food-handlers who received 60% or more of the maximum score (50) were considered to have appropriate attitudes towards food safety. In Part 4 trained members of the study team observed 14 practices regarding cleanliness, behaviors, personal hygiene and food hygiene. There were 11 close-ended question (scored from 0 to 1) and three multi-choice questions (scored from 0 to 3). Food-handlers who received 50% or more of the maximum score (20) were considered to have demonstrated adequate food safety practices.

The data collection tools were pre-tested and revised accordingly. All members of the study team were trained to obtain consistent interviewing standards. Data were processed daily to ensure completeness and internal consistency.

Data were analyzed by using R software (Epi, BMA and car packages). Frequencies and proportions were used to describe categorical variables and measures of central tendency were used to describe continuous variables. Prevalence ratios (PRs) and 95% confidence intervals (95% CI) were used to assess the relationships among KAP. Logistic regression models were used to calculate prevalence odds ratios (PORs) and 95% CI to assess differences in KAP between food-handlers in schools and factories. Model building and selection for KAP variables was based on Bayesian Model Average and variables which were known to be associated with KAP in previous studies (including gender, age, educational level and length of work experience). Goodness-of-fit of the models was assessed by Hosmer–Lemeshow test.

To obtain information about the training needs of food-handlers, ten focus group interviews were conducted with groups of 8–12 food-handlers. Maximum variation sampling was used to select food-handlers in each study setting who had different responsibilities in food handling. Qualitative data were coded and analyzed manually. Open coding, focused coding and axial coding were applied to analyze the data.

The study protocol was reviewed and approved by the World Health Organization Office in Hanoi, Vietnam. Informed consent was obtained from all study subjects and identities of individuals and establishments were kept confidential.

3. Results

3.1. Descriptive analysis

A total of 909 of 919 food-handlers participated in the study (response proportion, 99%); 692 (76%) of them were females. The median age was 38 years (interquartile range (IQR) 27, 45) and median length of work experience in food-handling was 36 months (IQR 8, 84) (Table 1). Eighty-four percent of food-handlers had graduated from secondary school or above, only about 1% were illiterate. Ninety-eight percent of food-handlers were trained in food safety principles within one year and 99% had passed a medical check-up before beginning work. Overall, of all participants, 26%, 36%, and 26% were considered to have adequate KAP regarding food safety, respectively (Table 2).

In univariate analysis of the relationship between knowledge and attitudes, 101 (43%) of participants with adequate knowledge had appropriate attitudes compared with 224 (33%) with inadequate knowledge (PR = 1.3; 95% CI: 1.1, 1.7). Similarly, in the analysis of the relationship of knowledge and practice, 116 (48%) of participants with adequate knowledge had appropriate practices compared with 124 (18%) who had inadequate knowledge (PR = 2.7; 95% CI: 2.2, 3.3). There was no significant association between appropriate attitudes and adequate practice.

3.2. Comparison of food handlers working in schools and factories

Among the 909 food-handlers participating in the study, 461 (51%) worked in schools and 448 (49%) worked in factories. Among those working in schools, 450 (98%) were female, whereas 242 (54%) of those in factories were female (Table 1). Of food-handlers working in schools, 91% were secondary school graduates (attended 6 or more years of school) compared with 77% of those working in factories. The median ages were 41 years (IQR 34, 47) and 28 years (IQR 22, 42) for food-handlers in schools and factories, respectively. The median work experience for those working in schools and those working in factories was 60 months (IQR 24, 108) and 12 months (IQR 3, 36), respectively. There were significant differences for gender, educational level, age and duration of

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