

SOCIODEMOGRAPHIC CHARACTERISTICS OF FOOD HANDLERS AND THEIR KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS FOOD SANITATION : A PRELIMINARY REPORT

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Abstract. Diseases spread through food still remain a common and persistent problems resulting in appreciable morbidity and occasional mortality. Food handlers play an important role in ensuring food safety throughout the chain of production, processing, storage and preparation. This study is to explore the pattern of sociodemographic distribution and to determine knowledge, attitude and practice of food handlers towards food-borne diseases and food safety. A total of 430 food handlers were randomly selected from Kota Bharu district and interviewed by using structured questionnaire. Distribution of food handlers was Malays (98.8%), females (69.5%), married (81.4%), working in food stalls (64.2%), involved in operational areas (49.3%), having no license (54.2%) and immunized with Ty2 (60.7%). The mean age was 41 ± 12 years and the mean income was RM 465 ± 243 /month. The educational level was found as no formal education (10.5%), primary school (31.9%), secondary school (57.0%) and diploma/degree holders (0.7%). A significant number of food handlers (57.2%) had no certificate in food handlers training program and 61.9% had undergone routine medical examinations (RME). Almost half (48.4%) had poor knowledge. Multiple logistic regression showed type of premise [Odd ratio (OR) = 4.0, 95% Confidence interval (CI) = 1.8-7.5, $p = 0.0004$], educational level (OR = 4.0, 95% CI = 1.8-7.4, $p = 0.0003$) and job status of food handlers (OR = 0.5, 95% CI = 0.3-0.8, $p = 0.0031$) significantly influenced the level score of knowledge. No significant difference of attitude and practice between trained and untrained food handlers. Findings of this preliminary study may help in planning health education intervention programs for food handlers in order to have improvement in knowledge, attitude and practice towards food-borne diseases and food safety. Furthermore, it will in turn reduce national morbidity and mortality of food-borne diseases.

INTRODUCTION

Food is an important basic necessity: its procurement, preparation, and consumption are vital for the sustenance of life. However, diseases spread through food are common and persistent problems that result in appreciable morbidity and occasionally in death. (Ministry of Health, 1998a; Ranjit, 1998; WHO, 1998). Food-borne diseases are increasing in both developed and developing countries (Ranjit, 1998; WHO, 1998; Kaferstein and Abdussalam, 1999). The main diseases are typhoid, cholera, hepatitis A, food poisoning and dysentery. Kelantan has more cases of typhoid and hepatitis A than any other state in Malaysia; cholera remains

an endemic food- and water-borne disease and cases occur periodically; in addition, typhoid and hepatitis A are endemic in the state and give rise to clusters of disease and periodic outbreaks (Ministry of Health, 1998a). In the United States, between 24 and 81 million people become ill each year from the consumption of contaminated foods and many cases of food-related illness are caused by the mishandling of food, especially in retail establishments (Climent, 1999).

Food-borne disease is attributed to a wide variety of bacteria, parasites and viruses. It is found worldwide and cause human illness just about everywhere (Scott and Sockett, 1998; Tauxe, 1998; WHO, 1998). While the pathol-

ogy, disease spectrum and causative agents differ, the same basic disease risk factors influence transmission. Although numerous control strategies are in place, person-to-person disease transmission has not ceased. Food handlers play an important role in ensuring food safety throughout the chain of production, processing, storage, and preparation (Hedberg *et al*, 1994; Goh, 1997; WHO, 1998). Approximately 10 to 20% of food-borne disease outbreaks are due to contamination by the food handler. The mishandling of food and the disregard of hygienic measures enable pathogens to come into contact with food and, in some cases, to survive and multiply in sufficient numbers to cause illness in consumers. Personal hygiene and environmental sanitation are key factors in the transmission of food-borne diseases. Investigations of outbreaks of food-borne disease throughout the world show that, in nearly all instances, they are caused by the failure to observe satisfactory standards in the preparation, processing, cooking, storing or retailing of food (Yew *et al*, 1993; Merican, 1997; Luby *et al*, 1998; WHO, 1988b).

In Malaysia, the Food Quality Control Division (FQCD) of the Ministry of Health (MOH) runs the food control program. The training of food handlers started in 1996; 90,170 food handlers were trained from 1996 to 1998 (FQCD, 2000). The training program is being conducted by private training institutions accredited by the FQCD. With training, it was expected that the food handlers would adopt good hygienic practices that would lead to the reduction of food-borne diseases. In Kelantan, the total number of food handlers was 29,124 of which 1,317 (4.5%) were trained in 2000 (FQCD, 2000).

Education, training, and the development of food safety certification examinations are key components in the process of ensuring that food handlers are proficient in and knowledgeable about food safety and sanitation principles (Jacob, 1989); it is important to emphasize the effectiveness of health education programs for food handlers. This study was conducted with the aim of exploring the sociodemographic

distribution of food handlers and determining their knowledge, attitude and practice (KAP) of food sanitation. The results of this study may help in identifying proper and suitable methods for planning health education programs for food handlers that will improve their knowledge, attitudes, and practices. Evaluation is an essential component in determining the effectiveness of health education programs. Health education programs may reduce national morbidity, mortality, and the transmission of food-borne diseases.

MATERIALS AND METHODS

This study was the preliminary phase of a three-phase non-randomized controlled trial: Phase I included preliminary data collection (sociodemographics and KAP) related to food-borne diseases and food safety; Phase II was an intervention program involving both intervention and control groups. Interventions were conducted in the Peringat Subdistrict (health education on food-borne disease and food safety for food handlers) and in the Ketereh subdistrict (control group; health education on healthy diet was given); Phase III was an evaluation on the effectiveness of the intervention program.

During the period January 1st to March 31st, 2001 (Phase I), 430 food handlers were recruited: 215 from each of the two sub-districts, Peringat and Ketereh. The food handlers were contacted directly at their premises; a list of food handlers was obtained from the registry of Kota Bharu District Council. The purpose of the study was explained and the informed consent of each food handler was obtained. A questionnaire was developed and pretested in Bahasa Melayu; the validity and reliability of the questionnaire were tested using preliminary data. There were 2 sections in the questionnaire: (i) sociodemography and (ii) knowledge, attitude, and practice (KAP) of food-borne disease and food handling. The socio-demographic section included: age, race, sex, marital status, educational level, food-handling

status, duration of experience, training status, license status, immunization status, type of food establishment, and income. Food establishments were inspected, with an emphasis on personal hygiene and environmental sanitation. Trained interviewers administered the questionnaires and inspected food establishments.

Food handler was defined as a person in the food trade or someone professionally associated with it, such as an inspector who, in his routine work, comes into direct contact with food in the course of its production, processing, packaging or distribution (including raw milk for direct consumption) (WHO, 1988b). *Food* was defined as every article manufactured, sold, or represented for use as food or drink for human consumption, or any item that enters into or is used in the composition, preparation, or preservation of any food or drink. Food and drink includes confectionery and chewing substances and their respective ingredients (Food Act 1983; FQCD, 1999). *Premises* included any building or tent or any other structure, permanent or otherwise, together with the land on which the building, tent or other structure is situated and any adjoining land used in connection therewith and any vehicle, conveyance, vessel or aircraft; and for the purpose of any street, open space or place of public resort or bicycle or any vehicle used for or in connection with the preparation, preservation, packaging, storage, conveyance, distribution or sale of any food (Food Act 1983; FQCD, 1999).

Statistical analysis

Sample size estimation was calculated based on the proportion of food handlers in Kelantan. The required sample size was 430 food handlers. Factor and reliability analyses were applied on 100 food handlers to test validity and reliability of questionnaire. Data were entered and analyzed by SPSS software version 9.0 (Norusis, 1999). Initially subjects were classified into trained and untrained food handlers in order to assess the difference of knowledge, attitude and practice between them. The score of knowledge, attitude and practice

were categorized as: poor or adequate knowledge, poor or good attitude and poor or good practice based on the summation of individual scores of the variables. Potential influencing factors towards knowledge were examined by using univariate and multivariate analyses. For univariate analysis, simple logistic regression was applied to identify significant variables. Variables that were found statistically significant in univariate analysis, biologically plausible and those under main interests of the study were included in multivariate analysis. Final model was estimated by applying multiple logistic regression. Maximum likelihood ratio estimation was used to estimate the parameters and the goodness of fit was applied to assess models. The 95% confidence interval with 5% level of significance was taken. Likelihood ratio (LR) test was applied to assess the statistical significance. The results were presented by appropriate tabulations based on the determined variables, crude or adjusted odds ratio with 95% confidence interval and its corresponding p-values.

RESULTS

Distribution of food handlers by socio-demographic variables were Malays (98.8%), females (69.5%), married (81.4%), working in food stall (64.2%), involved in operational areas (49.3%), having no license (54.2%) and immunized with Ty2 (60.7%). The mean age was 41 ± 12 years with range 14 to 70 years and the mean income was RM 465 ± 243 /month. The educational level was found as no formal education (10.5%), primary school (31.9%), secondary school (57.0%) and diploma/degree holders (0.7%). A significant number of food handlers (57.2%) had no certificate in food handlers training program and 61.9% have undergone routine medical examination (RME). Fig 1 shows that most of the food handlers had adequate knowledge about mode of transmission (82.1%) and mode of prevention (83.3%) of food-borne diseases. They had poor knowledge in etiology (58.8%), symptoms (59.3%) and treatment (52.6%). Attitude to-

wards food-borne diseases was good almost in all aspects, awareness of seriousness (93.5%), belief as a curable disease (99.1%), belief as a preventable disease (94.4%) and belief of the importance of training program (95.3%) except in awareness of personal hygiene (55.8%) as shown in Fig 2. On the contrary practice towards food-borne disease and food safety was poor in view of hand washing (50.9%), personal hygiene (63.7%), treatment (50.2%) and safety food handling (54.7%) as shown in Fig 3. There were significant differences of knowledge ($\chi^2 = 4.6, p < 0.05$) and practice ($\chi^2 = 5.1, p < 0.05$) between trained and untrained food handlers. However, there was no significant difference of attitude between them.

On univariate analysis, there were significant differences between poor and adequate knowledge regarding educational level, job status, sex, license, type of premise and training. Crude odds ratio with corresponding 95% confidence interval and p values were shown in Table 1.

On multivariate analysis (multiple logistic regression) variables that were found as significant potential influencing factors were type of premise predominantly food stall and level of education mainly secondary school. Ad-

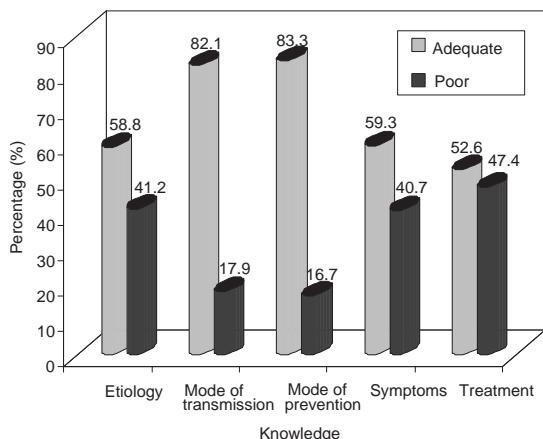


Fig 1–Knowledge about food-borne diseases among food handlers (n = 430).

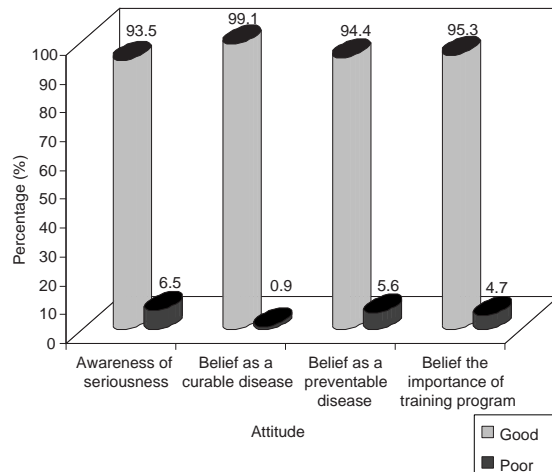


Fig 2–Attitude towards food-borne diseases by food handlers (n = 430).

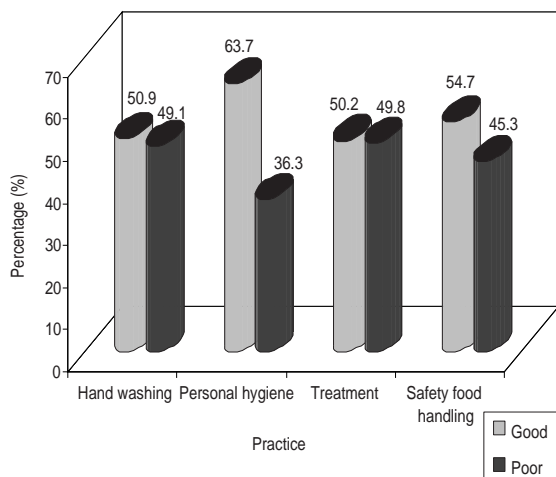


Fig 3–Practice towards food-borne disease by food handlers (n = 430).

justed odds ratio with their confidence intervals and p values were shown in Table 2.

DISCUSSION

From this preliminary study, a significant number of food handlers (57.2%) were not trained under food handler’s training program

Table 1
Univariate analysis of relationship between knowledge and sociodemographic factors.

Variables	Knowledge ^a (n=208)	Crude OR,(95% CI)	p-value
Age (mean±SD)	41 ±12	0.0008 ^c	0.927 ^b
Income (mean±SD)	457 ±246	0.0003 ^c	0.503 ^b
Sex (%)			
Male	51 (24.5)	1.0	
Female	157 (75.5)	0.6 (0.4-0.9)	0.010 ^b
Marital status (%)			
Single	31 (14.9)	1.0	0.262 ^b
Married	165 (79.3)	1.3 (0.7-2.2)	0.374
Divorce	5 (2.4)	1.8 (0.5-6.3)	0.333
Others	7 (3.4)	0.3 (0.1-1.7)	0.188
Level of education (%)			
No formal education	31 (14.9)	1.0	0.001 ^b
Primary school	78 (37.5)	1.7 (0.8-3.4)	0.158
Secondary school	98 (47.1)	3.3 (1.7-6.6)	0.001
Diploma/degree	1 (0.5)	4.4 (0.4-52.9)	0.240
License (%)			
No	126 (60.6)	1.0	
Yes	82 (39.4)	1.7 (1.1-2.4)	0.010 ^b
RME (%)			
No	87 (41.8)	1.0	
Yes	121 (58.2)	1.4 (0.9-2.0)	0.128 ^b
Duration of experience (%)			
<6 months	24 (11.5)	1.0	0.019 ^b
6 months to 1 year	30 (14.4)	0.9 (0.4-1.8)	0.692
>1 year to 5 years	75 (36.1)	0.8 (0.4-1.5)	0.481
>5 years to 10 years	26 (12.5)	1.9 (0.9-3.9)	0.077
>10 years	53 (25.5)	0.7 (0.4-1.4)	0.347
Type of premise (%)			
Restaurant	32 (15.4)	1.0	0.001 ^b
Food stall	112 (53.8)	3.6 (1.8-7.2)	0.001
School canteen	64 (30.8)	1.7 (0.8-3.7)	0.152
Status (%)			
Management	87 (41.8)	1.0	
Operation	121 (58.2)	0.5 (0.3-0.7)	0.001 ^b
Training (%)			
No	130 (62.5)	1.0	
Yes	78 (37.5)	1.5 (1.0-2.2)	0.032 ^b
Immunization (%)			
No	84 (40.4)	1.0	
Yes	124 (59.6)	1.1 (0.7-1.6)	0.657 ^b

^a expressed as percentage of poor score.

^b simple logistic regression.

^c regression coefficient with 95% confidence interval.

and majority of them (65%) were from food stall, school canteen (22.8%) and restaurant (12.2%). A total of (72%) of untrained had no license. In Malaysia, training of food handlers

started in 1996 and a total of 90,170 food handlers were trained from 1996 to 1998. (FQC Unit, 2000). However, as the number of trained food handlers increased, the food-borne disease

Table 2
Multivariate analysis of relationship between knowledge and significant variables.

Variables	Adjusted OR (95%CI)	p-value
Sex		
Male	1.0	
Female	0.7 (0.4-1.1)	0.126
Level of education		
No formal education	1.0	-
Primary school	1.5 (0.7-3.2)	0.279
Secondary school	3.6 (1.8-7.4)	0.001
Diploma/degree	5.8 (0.5-72.6)	0.170
License		
No	1.0	
Yes	0.7 (0.4-1.5)	0.400
Type of premise		
Restaurant	1.0	-
Food stall	3.6 (1.8-7.5)	0.001
School canteen	2.0 (0.9-4.3)	0.089
Status		
Management	1.0	-
Operation	0.5 (0.3-0.8)	0.003
Training		
No	1.0	-
Yes	1.4 (0.9-2.3)	0.153

cases also increased and food poisoning cases mostly occur at school canteens/hostel. It may be due to the fact that the target group of food handlers or high-risk group of people handling food were not properly selected and also no evaluation was done towards the effectiveness of the training program. Therefore it is important to emphasize that all food handlers especially hawkers and those involved in food stall must be trained before they are allowed to operate. Close cooperation between the Ministry of Health, the Ministry of Education (school canteens/hostel kitchen) and local government (that issues the licenses for the premises) is needed to ensure that all the food handlers are trained.

This study showed that food stall had four times significantly higher odds of having poor knowledge. The main reason of this was food handlers who involved in food stall/hawkers activities were not all registered with local government, had low level of education and were not trained. An effort must be made to

insist that all food handlers especially hawkers/food stall be registered, licensed and undergone training on basic food hygiene and handling. This may need cooperation from local government in view of financial support as the food handlers usually had low income. The training programs need an evaluation to ensure the effectiveness since majority of food handlers had low level of education which may cause poor understanding towards food-borne diseases and the importance of food safety measures. Food handlers had poor knowledge in etiology, symptoms and treatment, as shown in this study.

From this study, food handlers had good attitude towards food-borne diseases though they did not practice accordingly during their daily activities. Their practice were poor in hand washing, personal hygiene and safety food handling. Hand washing practices should be emphasized to food handlers as the hands need to be washed carefully before touching food or any sort and particularly after handling

raw food ingredient, which will introduce bacteria daily to the kitchen and before continuing with other cooking preparations (Hobbs and Roberts, 1993). Hand cleanliness is one of the most critical parts of a food producer's daily regimen. Following that, stricter action is needed on food establishment with the aid of the Food Act of 1983 and the Disease Prevention and Control Act of 1988. Inspection of food premises should be done to ensure sanitary premises. Priority must be given to school canteens and hostel kitchens because food poisoning cases usually occurred mainly in schools and institutions. In 1997, the total number of inspections on hostel kitchens and school canteens is only 9% (4,323) of the total number of inspections instead of total number of school canteens present in 1997 is about 6,224 (FQC Unit, 2000). Unhygienic premises should not be allowed to operate unless upgraded.

Food handlers often have little understanding of the risk of microbial or chemical contamination of food or how to avoid them (Hobbs and Roberts, 1993). As the poorly paid job, it is poorly motivated and rapid staff turnover also causes problems. Food handlers should therefore receive suitable training in the basic principles of food safety (WHO, 1998). Particular attention should be given to the importance of time and temperature control, personal hygiene, cross contamination, sources of contamination and the factors determining the survival and growth of pathogenic organisms in food (WHO, 1988b; Goh, 1997). At the end of the training period, the knowledge and understanding of food safety on the part of food handlers should be tested. The use of attractive and explicit poster-type displays in workrooms is considered to be effective way of reminding food handlers of various aspects of food safety (WHO, 1988b).

Findings of this preliminary study may help in planning health education intervention programs for food handlers in order to have improvement in knowledge, attitude and practice towards food-borne diseases and food safety. Furthermore, it will in turn reduce national

morbidity and mortality of food-borne diseases. Education, training and the development of food safety certification examinations are key components in the process of ensuring that food handlers are proficient in and knowledgeable about food safety and sanitation principles.

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