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Hygiene Practices of Food Handlers at Malaysian Government Institutions Training Centers

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Abstract

This study assesses the level of food hygiene practices among food handlers. Study population includes 318 food handlers in the Northern region of Malaysia. The instrument includes questions with negative words to ensure respondents' alertness. Findings indicate hygiene practices are in line with the requirements of the Food Act 1983 and Food Hygiene Regulations 2009. Mean scores of food hygiene variables demonstrate that food handlers have played a role in implementing good hygiene practices in the food service industry. In this sense, working experience and consistent exposures in food handling activities have added value to the practices.

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1. Introduction

Food service is unique because it touches the lives of all of us on a daily basis. As food service is defined where the food is regularly served outside the home (Payne-Palacio & Theis, 2012), the industry continues to evolve since food establishments can be found anywhere, including fast food outlets, hospitals, schools, universities, convenience stores, supermarkets, nursing homes, stadium concessions, child care and elder care, military bases, transport terminals, prisons, and so on (Garayoa, Vitas, Diez-Leturia, & Garcia-Jalon, 2011). Food industry is considered to be a large industry as it is made up of

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businesses that produce, manufacture, transport, and distribute food from farm to fork (McSwane, Rue, & Linton, 2000). With globalization, food service industry has developed enormously and the industry could prosper for its bottom line.

With Malaysia's population of 28.34 million in 2010, expectations and demand by health community is on the rise (Ministry of Health, 2012). In 2012, food poisoning was the most critical factor in food and water-borne diseases which contributed to more than 56 incident rates per 100,000 populations of Malaysia. Other reported communicable diseases incident rates in year 2012 were cholera (2.02), hepatitis A (1.71), typhoid (0.84), and dysentery (0.15). On closer examination, Figure 1 demonstrates the significant growth of incident rates for food poisoning cases in 12 consecutive years has been increasing to 25 times (Ministry of Health, 2012) which alarmed for further action.

The food-borne diseases in the Malaysian food industry were identified to be caused by microbiological hazards. Further, recent health risk assessments have revealed that the food-borne disease may be triggered by: (1) improper food handling training, (2) the use of untreated water for non-drinking purposes, and (3) low sanitation and hygiene status (Ministry of Health, 2012). These findings revealed that other than ready-to-eat foods and water sources, food handlers themselves are also a source for the contamination. While food borne pathogens is the cause of about 30% of human diseases (Serraino et al., 2010), Nyi et al. (2007) highlighted that food handlers implicated about 10 to 20% of the disease outbreaks.

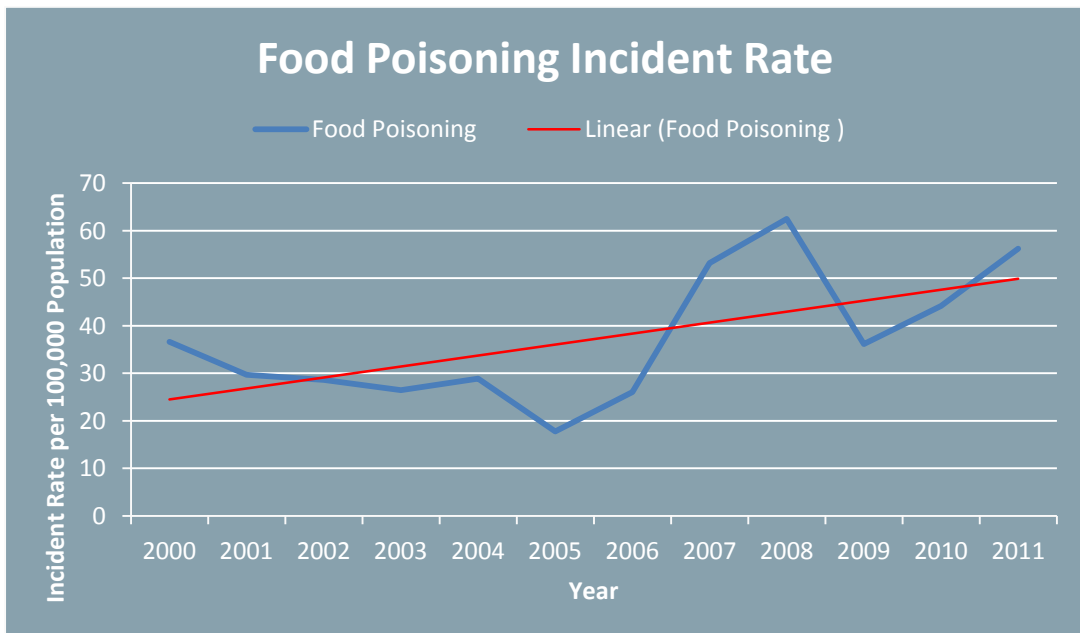


Fig. 1. Food poisoning incident rate

In Malaysia, food service operations in both institutions and schools often appear in the annual report of the Ministry of Health (MOH). However, compared to schools, food service operations at institutions operate seven-day a week where a large number of people must be served quickly. Time factor was identified to be the cause of food handling errors, as they are likely to happen against the serving time (Jacxsens et al., 2009), mistakes in controlling the cooking temperature, and improper holding time of

food which are ready to be served (Griffith, 2006; Mazni, Toh, Mohamed Azam, & Debbie, 2012). The situation would become more complicated when there is a shortage of manpower. In connection with this circumstance, contract labour is an initiative taken by the food services to overcome the problem although the use of contract workers has been perceived by many to have compromised hygiene standards. Seriousness in hygiene practices is vital because one food-borne illness outbreak can have devastating consequence for health (Serraino et al., 2010).

Highlighted food borne issues and statistics indicate that having access to safe food practices is essential for community health. It is fundamental to remove unwanted contaminants as it poisons our food and could give negative impact to surrounding environment, especially on community health (Lahou, Jacxsens, Daelman, Van Landeghem, & Uyttendaele, 2012; Rodriguez, Valero, Posada-Izquierdo, Carrasco, & Zurera, 2011). However, little is known as to what extent hygiene is practised by food handlers. Therefore, this study focuses on the objective to assess the level of food hygiene practices among food handlers. Understanding the level of food hygiene practices' is fundamental towards improving the health status of an individual or overall population as the next step of action.

2. Literature review

2.1. Food safety

Food is essential to sustain life and it is an important business component in the hospitality industry (Kandampully, 2007). To obtain a healthy life, food safety is an essential quality. However, the quality or free-hazards management is one of the most challenging tasks that food services encounter (Payne-Palacio & Theis, 2012). The challenges, according to Payne-Palacio and Theis (2012) include: (1) people ignore the reported outbreaks because it is only a fraction of the total of people who actually get sick from food, (2) under-reported statistics due to complications in deciding food-borne illness, as symptoms varies on different victims depending on their age, state of being pregnant, or those with compromised immune systems, and (3) agents of food-borne illness varies e.g. water, contact with animals, or person-to-person.

2.2. Microbial contaminations

Hygiene is the essence of the food service business. In turn, the absence of it could result in food-borne infections. Food-borne infections were widely reported due to microbial contamination loads contain in food and water (Cunningham, Rajagopal, Lauer, & Allwood, 2011; Lahou, Jacxsens, Daelman, Landeghem, & Uyttendaele, 2012). Other than food and water, microbial contamination is explained by the transmission of enteric pathogens and other microbial hazards through air, contaminated utensils and food contact surfaces (Rodriguez, Valero, G. D. Posada-Izquierdo, Carrasco, & Zurera, 2011). Rodriguez et al., (2011) also highlighted many additional factors discussed by other scholars, such as Baert et al. (2009), Uyttendaele et al. (2009), Worsfold and Griffith (2003). These scholars consistently agreed that food from unsafe sources, inadequate cooking, improper holding times and temperature abuses, food handlers' malpractices, or combinations of these have the linkage with the food service operations. In short, the microbial contaminations indicate the sanitary conditions of food service systems, and best practices of hygiene in food handlings can be aimed for reduction of pathogens and spoilage bacteria.

2.3. Food handlers

Food handlers become a target in this research as they are the key players in determining and controlling the best practices of hygiene. Food handlers are defined as individuals who are (1) directly involved in the food preparation, (2) come into contact with food or food contact surfaces, and (3) handle packaged or unpackaged food, or appliances, in any food premises (Food Act 1983 [Act 281], 2012). In a study of personal hygiene intervention measures, Michaels et al. (2004) highlighted that infected food handlers could transmit infectious intestinal diseases (IID) caused by food-borne pathogens. The study listed 15 organisms outbreaks associated with infected food workers and they included: *Caliciviruses (norovirus)*, *Salmonella spp.*, *hepatitis A*, *Shigella spp.*, *Staphylococcus aureus*, *Streptococcus pyogenes*, *Salmonella typhi/paratyphi*, *Vibrio cholera 01*, *Yersinia enterocolitica*, *Giardia lamblia*, *Campylobacter jejuni*, *Cryptosporidium parvum*, *Escherichia coli* O157:H7, *Cyclospora cayetanensis*, and *Entamoeba histolytica*. Food workers are crucial as they have direct contact to activities, such as deboning, slicing, chopping, adding garnishes, most of which do not require further heating steps prior to consumption. Their correct behaviour and appearance would reward more on a sanitary environment.

Similar to other industries, food handlers in Malaysia are divided into two distinct types: permanent and temporary workers. Temporary workers refer to contract and part time labours who, in most cases fill the labour shortages with low-skilled and poorly remunerated positions (Lenard & Straehle, 2012). According to Lenard and Straehle (2012), work contracts are tied-free for a specific employer. While the food business is most likely dominated by the temporary labour, the devotion and commitment of these labourers are often misjudged by the public (Chambel & Alcover, 2011). The short-term labour is the 21st century challenge as they are implicit to reduce their contributions and commitment to set standards (Bordia, Restubog, Bordia, & Tang, 2010). Given that effective recruitment is when the workers fit the job specifications and are competent, contractual condition is also known as ‘there are other life priorities’ and the ability of the workers to leave their work without guilt (Casey & Alach, 2004). In the scenario of the possible negative effect of temporary work, it would raise public concern of the health community on food operations’ ability to ensure food safety.

2.4. Hygiene practices

In view of the discussion in the previous section, adherence to correct food hygiene practices need to be understood for best prevention of most outbreaks (Luyt, 1996). Hygiene is defined as “a system of principles for preserving health” while practices is defined as “the actual doing of something,” “to do or engage frequently,” or “to make the habit of” (Merriam-Webster, 2006). Thus, hygiene practice in this research is conceptualized as a habit to engage in health prevention activities.

Among the prevention measures taken by many food operations are the application of good manufacturing practices and good hygiene practices, the use of the International Organization for Standardization (ISO) method 9001, hazard analysis critical control point (HACCP), and Total Quality Management (TQM) (Aruoma, 2006). In Malaysia, while these prevention measures are voluntary based, adoption of hygiene practices is facilitated under Food Act 1983 [Act 281] and Food Hygiene Regulations 2009. The Food Hygiene Regulations 2009, conferred by section 34 of the Food Act 1983 [Act 281] and was passed on 28 February 2009.

Studies suggest that emphasizing preventative food safety can contribute to significant impact towards the outbreaks (Osimani, Aquilanti, Babini, Tavoletti, & Clementi, 2011). The emphasis on appropriate hygiene practices evidence has been centralized on food safety and documented in several focuses, such as on ready-to-eat meals, water sources, contact surfaces, knowledge and attitudes, effective hygiene intervention strategies, just to mention a few (Buccheri et al., 2010; Holvoet, Jaxsens, Sampers, &

Uyttendaele, 2012; Lahou, Jacxsens, Daelman, Van Landeghem, et al., 2012; Michaels et al., 2004; Murphy, DiPietro, Kock, & Lee, 2011; Tang & Fong, 2004). Preventative measures for hygiene can be done through microbial research (Balzaretto & Marzano, 2012; Lahou, Jacxsens, Daelman, Landeghem, et al., 2012; Rodriguez, Valero, G. D. Posada-Izquierdo, et al., 2011). However, the microbial analysis is costly, time consuming, and reactive in measures. Conversely, hygiene practices measure by using questionnaire survey is more practical, economical, and able to cover a wider range (Sekaran, 2010).

3. Methodology

3.1. Participants

In order to assess the level of food hygiene practices, the unit of analysis of this research was at individual level. The targeted populations were operational food handlers working in government institutions. For this research, food handlers are defined as *anyone who is employed exclusively for food preparation and services in kitchen and dining hall*. This research was conducted cross-sectionally in October 2012 and covered all 25 kitchens operations of government institutions in four Northern States of Peninsular Malaysia: Perlis, Kedah, Penang, and Perak. Food service operations at these training centres are held over three consecutive months for three times a year. All trainees solely rely on food and drink provided by them. In general, the training centres have been in operation since 2003 and the kitchen operation has been monitored by the MOH through ‘*Latihan Kendiri*’ (self-check) checklist. The checklist contains food premise and food handlers’ hygiene elements.

3.2. Measurements

The tools used to gather information for the objective of this study were self-rated questionnaire survey. This research adapted and measured food safety practice instrument developed by Bolton et al. (2008) and Martin et al. (1999). These 16-item questions were cross-checked with the MOH’s ‘*Latihan Kendiri*’ (self-check) checklists, and hygiene elements highlighted in the Food Hygiene Regulations 2009. The instrument was then translated into Bahasa Melayu, Malaysia’s national language. Focusing on food premise and food handlers, nine questionnaire survey items included negatively worded questions for example “I do not cover my head when my hair is neatly combed” to ensure respondents stay alert and to increase the enjoyment of answering the survey. Most importantly, it was to avoid any tendency of food handlers to instinctively respond to one end of the scale.

Before commencing the data collection, the researcher first liaised with the MOH for the approval to conduct this research. Sample of questionnaire survey was also taken to the MOH’s authorized government officers for their comments and improvement. The comments were carefully noted and rephrased. This type of validity is needed in order to ensure the clarity of the question items for the targeted food handlers’ in the institutions under the MOH’s control. Subsequently, the written approval letter from the MOH and a personalized letter were attached together with the questionnaire survey.

3.3. Limitations

The fundamental objective of this study is to assess the level of food hygiene practices among food handlers at Malaysian government institutions training centres. Nevertheless, there are some limitations in this study. The focus of this study covered only the Northern region states as they are the main interests of the MOH. As the locations of each institution are in rural and sub-urban areas, the workers in general were made up of locals.

3.4. Data analysis

This research applied descriptive statistics to provide a feel of the raw data and to help in describing the characteristics of the sample. For this purpose, statistics including frequencies, percentages, maximum, minimum, range, modes, medians, means, and standard deviations were computed on demographic variables (respondent personal profile). The data collected were processed and analyzed using SPSS version 21.0. Specifically, the SPSS tools utilized in this research for descriptive data, factor and reliability analyses. In this research, the mean scores were used for the assessment of hygiene practices' level among the food handlers.

4. Results and discussions

The initiative of attaching a personalized letter to the questionnaire survey turned out to have a very positive response from the respondents. Out of 500 questionnaires which were distributed through postal mail to 25 government institutions, a total of 318 questionnaires were fully answered (63.6%) and 15 empty questionnaires were returned. Subsequently, the usable 318 questionnaires were coded and analyzed accordingly.

4.1. Profile of the respondents

The respondents' profile is shown in Table 1. Male respondents slightly dominated the survey by 4.2%. About 48% were below 30-years-old and their highest education background was primary school (50.6%). However, for the question on education background, 67 surveys were left unanswered. The dominant participation came from contract food handlers (73.5%) and they were working at normal hours (65.4%). Interestingly, more than 80% are experienced in the field; the majority of them had working experience between one and five years (60%). For minimum food safety requirements, more than 97% declared they had typhoid immunization and 70% agreed that the food handling course was useful for their work.

Demographic variables describe that almost equal number of young male and female food handlers participated in this research. Although they have a minimal education background, the food handlers are quite experienced in food service employment.

This group is engaged in the government food service institutions as contract food handlers during normal working hours. The majority of food handlers in this research had typhoid immunization and attended food handling course as minimum requirements prior to their employment. However, as far as food handling course is concerned, about 30% of the respondents disagreed with the contents of food handling course that is said to help improve their knowledge at work.

This information is consistent with the findings on risk assessment conducted in 2010 by the Ministry of Health (MOH Annual Report, 2012). By studying the pattern of the presented demographic and missing data on highest qualification background (21%), there is a possibility that the number of temporary employees is greater than was declared in the statistical data.

Table 1. Profile of respondents

Demographic Variables	Categories	Frequencies	Percentage
Gender	Male	164	52.1
	Female	151	47.9
Age	Below 18 years old	19	6.1
	18 to 30	150	47.9
	31 to 40	62	19.8
	41 to 50	49	15.7
	Above 50	33	10.5
Higher Education	College/University	11	6.8
	Secondary School	19	41.0
	Primary School	179	50.6
	Others	4	1.6
Working Status	Permanent	39	12.5
	Contract	230	73.5
	Part Time	44	14.1
Working Hours	Less than 8 hours	60	19.0
	8 to 10 hours	206	65.4
	More than 10 hours	49	15.6
Working Experience	Less than one year	57	19.3
	1 to 5 years	177	60.0
	6 to 10 years	54	18.3
	More than 10 years	7	2.4
Typhoid Immunization	Yes	295	98.7
	No	4	1.3
Food handling Course	Agree	200	70.2
	Disagree	85	29.8

Note. N=318; total score for negatively worded items are after the reversed process in SPSS analysis; items are based on 6-point *Likert*-type scale (1="never" to 6="always")

4.2. Descriptive statistics

Basically, descriptive statistics describe the respondents' characteristics (Hair, Black, Babin, Anderson, & Tatham, 2010). The sixteen items were analysed for reliability and validity and was found satisfactory. Table 2 shows overall means and standard deviations of the hygiene practices variable. Prior to it, the negatively worded items were reversed in the recoding process. Responses to all items were made on a 6-point *Likert*-type scale (1 = "never" to 6 = "always"). The descriptive statistics show that food handlers understand the questions asked and answered accordingly. As shown in Table 2, nine negatively worded items (question 2, 3, 5, 7, 10, 11, 13, 14, and 16) went through the reversed process in SPSS analysis. The results of mean score for these questions after the reversed process, for example, "I do not cover my head when my hair is neatly combed," obtained means score of 5.29 with a standard deviation (SD) of 1.54. Other question items such as "I continue to wear same apron as long as it looks clean," or "I do not remove a watch while working because time is precious for me" obtained the mean score of 3.24 (SD=2.04) and 5.42 (SD=1.43) respectively. The results show that there was no likely tendency of response to one end of the scale.

The mean scores for hygiene practices ranged between 3.24 to 5.73 in which indicate that good hygiene have been practiced in the institutions. The means score is statistical inference which is used to estimate the actual proportion or drawing conclusions about a total population (Levine, Stephan, Krehbiel, & Berenson, 2008). Meanwhile standard deviations ranged between 0.87 and 2.15, which indicate mean values are highly dispersed among food handlers. All in all, the mean score results

demonstrate that hygiene practices are in line with the requirements of the Food Act 1983 and Food Hygiene Regulations 2009. Food handlers in the government institutions comply with the hygiene criteria needed for food premise and food handlers. The findings corroborate those of other studies in catering establishments, such as the study by Rodriguez et al. (2011), where the mean scores obtained for food handlers' practices was acceptable.

The overall scores basically show the overall implementation of good hygiene practice among food handlers in their workplace. Scores also describe that experienced food handlers have the advantages of the knowledge they obtained from the food handling course. Furthermore, the familiarization with the *Latihan Kendiri* (self-check) activities that they participated in the MOH's monthly programme have benefited the food handlers although they are relatively young, and from lower formal education background.

Table 2. Means scores and standard deviations for the hygiene practices.

Variables	Mean (M)	Standard Deviation
I clean the premise floor at each end meal	5.46	1.03
I use same chopping boards to prepare raw food and cooked food	4.62	1.96
I wash my hands in vegetable sink	4.75	1.88
I wear masks when I have the flu	4.48	1.86
I continue to work on a sick day	4.65	1.73
I wash my hands after using toilet	5.73	0.87
I do not remove watch while working because time is precious for me	5.42	1.43
I use waterproof plaster when get injured	4.24	1.99
I use a handkerchief when coughing	5.15	1.49
I continue to wear same apron as long as it looks clean	3.24	2.04
I do not cover my head when my hair is neatly combed	5.29	1.54
I let the dishware dry by itself	3.83	2.15
I use the same gloves for food cutting and food serving	5.37	1.50
I use clean work tops' kitchen towel to clean the plates	5.26	1.64
I do check shelf life of the product before I cook	5.42	1.43
I do not mind to use products that have little dented can	5.22	1.53

Note. N=318; the result of total score for negatively worded items in this table are after the reversed process in the SPSS analysis; the question items are no. 2, 3, 5, 7, 10, 11, 13,14, and 16. Items are based on 6-point *Likert*-type scale (1="never" to 6="always")

5. Conclusion

Good hygiene practices in the government institutions training centres are fundamental and current status of hygiene practices were assessed and analysed in order to understand the phenomenon before next action. While the objective of this research is to assess the level of food hygiene practices among food handlers, the findings of this study lead to the conclusion that in general food handlers in the government institutions are aware and do implement good hygiene practices. Working experience and consistent monitoring by the MOH have added value to the good hygiene practices, thus they are in line with the requirements of the Food Act 1983 and Food Hygiene Regulations 2009. Although contract food handlers are the dominant workers and most of them have lower level of education, they have not compromised the quality of hygiene. In view of these findings, despite the background of the food handlers, effort to inculcate good food hygiene practices must include continuous monitoring on the practices of the food handlers. Hence, the findings suggest that managers or food operators should have more sensible expectations in their food business. On the other hand, due to some limitations that exist in

this study, whereby the food handlers may feel that they are competent because they have been operating the business for quite some time, food hygiene practices should be analysed further via the triangulation methods for the consistency of the hygiene practice results which may enhance the generalization of the findings in future empirical research. Nevertheless, the implementation of hygiene practices means good business practices and without it, the business may soon cease to exist.

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References

- Aruoma, O. I. (2006). The impact of food regulation on the food supply chain. *Toxicology*, 221, 119-127.
- Balzaretto, C. M., & Marzano, M. A. (2012). *Prevention of travel-related foodborne diseases: microbiological risk assessment of food handlers and ready-to-eat foods in Northern Italy airport restaurants*. Food Control, (JFCO 2812). University of Mila, Italy.
- Bordia, P., Restubog, S. L. D., Bordia, S., & Tang, R. L. (2010). Breach Begets breach: Trickle-Down effects of psychological contract breach on customer service. *Journal of Management*, 36(6), 1578-1607.
- Buccheri, C., C. Mammina, S. Giammanco, M. Giammanco, M. La Guardia, & Casuccio, A. (2010). Knowledge, attitudes and self-reported practices of food service staff in nursing homes and long-term care facilities. *Food Control*, 21, 1367-1373.
- Casey, C., & Alach, P. (2004). 'Just a temp?' Women, temporary employment and lifestyle. *Work, employment and society*, 18(3), 459-480.
- Chambel, M. J., & Alcover, C.-M. (2011). The psychological contract of call-centre workers: employment conditions, satisfaction and civic virtue. *Economic and Industrial Democracy*, 32(1), 115-134.
- Cunningham, A. E., Rajagopal, R., Lauer, J., & Allwood, P. (2011). Assessment of hygienic quality of surfaces in retail food service establishments based on microbial counts and real-time detection of ATP. *Journal of Food Protection*, 74, 686-690.
- Food Act 1983 [Act 281]. (2012). *Food Hygiene Regulations 2009*. Kuala Lumpur: International Law Book Services.
- Garayoa, R., Vitas, A. I., Diez-Leturia, M., & Garcia-Jalon, I. (2011). Food safety and the contract catering companies: food handlers, facilities and HACCP evaluation. *Food Control*, 22, 2006-2012.
- Griffith, C. J. (2006). Food safety: where from and where to? *British Food Journal*, 108(1), 6-15.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2010). *Multivariate Data Analysis* (6th. ed.): Prentice Hall International Inc.
- Holvoet, K., Jacxsens, L., Sampers, I., & Uyttendaele, M. (2012). Insight into the Prevalence and Distribution of Microbial Contamination To Evaluate Water Management in the Fresh Produce Processing Industry. *Journal of Food Protection*, 75(4), 671-681.
- Jacxsens, L., Kussaga, J., Luning, P. A., Spiegel, M. V. d., Devlieghere, F., & Uyttendaele, M. (2009). A microbial assessment scheme to measure microbial performance of food safety management systems. *International Journal Food Microbiology*, 134, 113-125.
- Kandampully, J. a. (2007). *Services Management: The New Paradigm in Hospitality*. Upper Saddle River, New Jersey: Pearson Prentice Hall.
- Lahou, E., Jacxsens, L., Daelman, J., Landeghem, F. V., & Uyttendaele, M. (2012). Microbiological performance of a food safety management system in a food service operation. *Journal of Food Protection*, 75, 706-716.
- Lenard, P. T., & Straehle, C. (2012). Temporary labour migration, global redistribution, and democratic justice. *Politics, Philosophy & Economics*, 11(2), 206-230.
- Levine, D. M., Stephan, D. F., Krehbiel, T. C., & Berenson, M. L. (2008). *Statistics for Managers using Microsoft Excel*. New Jersey: Pearson International Edition.
- Luyt, S. A. (1996). *A study to assess the changes in hygiene of food premises following a specific health education programme*. Masters Diploma in Technology (Public Health), Cape Peninsula University of Technology, Cape Town.
- Mazni, S., Toh, P. S., Mohamed Azam, M. A., & Debbie, F. M. (2012, 3-5 Sept 2012). *The impact of food safety practices on organizational performance*. Paper presented at the International Hotel and Tourism Conference 2012: Journey into Challenging Times for Research & Innovations, Concorde Hotel, Kuala Lumpur Malaysia.

- McSwane, D., Rue, N., & Linton, R. (2000). *Essentials of Food Safety & Sanitation* (2nd edition ed.). New Jersey: Prentice Hall.
- Merriam-Webster. (2006). Merriam-Webster's Online Dictionary Retrieved 15 January 2007, from <http://www.m-w.com/dictionary/practices>
- Michaels, B., Keller, C., Blevins, M., Paoli, G., Ruthman, T., Todd, E., & Griffith, C. J. (2004). Prevention of food worker transmission of foodborne pathogens: risk assessment and evaluation of effective hygiene intervention strategies. *Food Service Technology, 4*, 31-49.
- Ministry of Health. (2012). Annual Report 2010 (pp. 385).
- Murphy, K. S., DiPietro, R. B., Kock, G., & Lee, J. S. (2011). Does the mandatory food safety training and certification for restaurant employees improve inspection outcomes? *International Journal of Hospitality Management, 30*, 150-156.
- Nyi, N. N., Maizun, M. Z., Wan Mansor, H., Hamzah, A. M., Noraidatulakma, A., & Mohd Hilmi, A. B. (2007). A study on effectiveness of health education program on knowledge, attitude and practice (KAP) of food handlers towards foodborne diseases and food safety. *International Medical Journal, 14*, 253-260.
- Osimani, A., Aquilanti, L., Babini, V., Tavoletti, S., & Clementi, F. (2011). An eight-year report on the implementation of HACCP in a university canteen: impact on the microbiological quality of meals. *International Journal of Environmental Health Research, 21*(2), 120-132.
- Payne-Palacio, J., & Theis, M. (2012). *Foodservice Management Principles and Practices* (12th. Ed. ed.): Prentice Hall.
- Rodriguez, M., Valero, A., G. D. Posada-Izquierdo, Carrasco, E., & Zurera, G. (2011). Evaluation of food handler practices and microbiological status of ready-to-eat foods in long-term care facilities in the Andalusia Region of Spain. *Journal of Food Protection, 74*(9), 1504-1512.
- Sekaran, U. (2010). *Research Methods for Business: A skill Building Approach* (Fourth ed.). Hoboken, New Jersey: John Wiley & Sons, Inc.
- Serraino, A., Veronese, G., Alonso, S., Matera, R., Lugoboni, B., & Giacometti, F. (2010). Bactericidal activity of electrolyzed oxidizing water on food processing surfaces. *Ital. J. Food Sci., 2*(22), 222-228.
- Tang, C., & Fong, U. (2004). A survey of food hygiene knowledge and attitudes among Chinese food handlers in Fong Song Tong District. *Journal of Public Health, 16*(2), 120-124.