



Hygiene, Control and Contamination in Foods: A Review

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ABSTRACT: Food hygiene is known as the measures taken and the methods applied to ensure the safety of food from production to consumption. Hygiene should come first among the most important features that consumers should look for in the foods they supply from outside. Contaminated products are at the root of most human infectious diseases in developing countries. These emerging diseases put serious pressure on health systems. These problems are prevented by hygiene control. Hygiene control is; from food to food contaminated, from equipment to food contaminated, from operator to food contaminated and in other ways contaminated. In the scientific researches and survey studies, it has been seen that the hygiene knowledge of the employees in food is at a moderate level. With this compilation study, the importance of hygiene, hygiene control, food hygiene and safety knowledge, as well as the attitude after the education in hygiene were emphasized.

Keywords: Food hygiene, Food safety, Hygiene control, Contamination

INTRODUCTION

Food hygiene is known as the measures taken and the methods applied to ensure the safety of food from production to consumption (Kaferstein and Abdussalam, 1999). Hygiene is a factor that consumers should look for when consuming food from outside. In developing countries, most of the infectious diseases in humans are caused by the consumption of contaminated food (Acharya et al., 2017; Bhattarai et al., 2018; Okugn and Woldeyohannes, 2018; Acharya and Poudel, 2020; Sevindik and Uysal, 2021). Besides food hygiene, food safety is also important. In order to ensure that food is safe and suitable for consumption, consideration must be given to aspects such as production, processing and storage. In the absence of proper hygiene and sanitation in the food business, foodborne illnesses occur when these foods are delivered to food handlers. Foodborne diseases are a problem in both developing and developed countries. The resulting diseases pose a serious problem on health systems. It also seriously affects people's health and well-being (Adams and Motarjemi, 1999; WHO, 2002; WHO, 2007).

Food businesses play an important role in the spread of foodborne pathogens. In addition, it is possible for human-oriented diseases to occur with the spread of these pathogens. Food businesses have an important role in ensuring that the food served is hygienic for consumption. As a result of deliberate or unintentional contamination of such foods, consumers are exposed to foodborne diseases. In order to avoid these problems, food hygiene and safety education has an important place (Okojie et al., 2005; Obionu, 2007; Chukwuocha et al., 2009; Ifeadike et al., 2012; Sevindik, 2018).

HYGIENE CONTROL

Hygiene control includes practices that will reduce the risk of contamination of clean foods. The purpose of hygiene control is to prevent the spread of bacteria. Some foods, such as raw meat and seafood, can become contaminated more quickly. The prevalence of foodborne diseases has increased in recent years. Changes in modern production, travel and trade reveal the importance of hygiene control in food. Because these situations encourage food poisoning and these situations are still up to date. Misuse of foods is an important factor in the increase of food diseases. Misprocessing of foods and deficiencies in hygiene constitute 97% of this situation. Contaminated situation can be from food to food, from equipment to food, from operator to food and in other ways. Therefore, the hygiene of such foods is very important.

Food-to-Food contamination

Products such as raw meat, poultry and seafood/fish should be kept away from other foods. These products are prone to contamination. The basis of this susceptibility is that it contains some biological infectious bacteria along with deterioration. These avoidance ways can be by separating the work area or using a deep freezer. These measures to be taken can reduce the contamination situation to a certain level. If these precautions are not taken or mistakes occur in the application, in short, if food hygiene is not observed, contamination may occur.

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Contamination from Water to Food

Water contamination in food is another important issue. Clean water is one of the most important conditions in food processing. Attention should be paid to the cleanliness of the water used in food. Because it is known that especially contaminated water, which is preferred for cleaning or cooking food, will play an important role in a bacterial disease and stomach discomfort. Therefore, it can be used for cooking, washing food, using ice, cleaning equipment or tools, washing hands, etc. It is important to pay attention to the use of clean water in all cases.

Contaminated from Equipment to Food

Equipment and work surfaces can be easily contaminated. This contamination situation can turn into an even more important situation when the products, which are expressed in food-to-food spoilage, come into contact with equipment and work areas. If the necessary hygiene is not applied to the equipment and surface area after each treatment, the contaminated state will be transferred to the new food to be used. In general, this can be avoided by using color codes. Red color code corresponds to raw meat and poultry, blue color fish, yellow color cooked meat, green color vegetables, orange color salad and fruit, white color bakery products.

Contaminated from Operator to Food

It is generally seen to be contaminated by direct contact. The situation of direct contact is among the situations that show itself immediately in food spoilage and disease situations. It should avoid direct contact route to eliminate food spoilage and disease states. Instead of direct contact; For food hygiene, clean tongs, plastic gloves, food bags or food packaging should be used.

Contaminated to Food by other ways

Prepared foods; It should be kept closed, away from garbage or other factors, should not be kept in the cleaning area, should be stored at the right temperature and safely. If necessary precautions are not taken, microorganisms in waste food or atmospheric contamination may occur (Collins, 1997; Kaferstein et al., 1997; Wheeler et al., 1999; Mikkilineni, 2016).

FOOD HYGIENE AND SAFETY KNOWLEDGE OF FOOD HANDLERS

Working areas of the personnel working in the food sector; consists of people who work in areas such as food production and preparation, food service department, retail sector. These personnel working in the food industry may play a role in food diseases in symptomatic or asymptomatic ways (Marci et al., 2002; Okojie et al., 2005). Because the place of food personnel in the society is very important. When some studies on food hygiene and safety are examined; In a study conducted to determine food safety knowledge among catering workers in the Southwest USA, it was revealed that the hygiene and safety knowledge of employees was 71.5%. In the research conducted in the hospital canteen of the medical school in New Delhi, it was seen that the level of knowledge was good, but the success was 32.5% when the informational research was carried out in 348 food processing in general. The work done on 411 handlers in Rome was found to be moderately good. However, it has also been reported that they need to improve themselves on food diseases and contamination. Among 65 food processors, Kebangsaan Malaysia also showed that their knowledge was moderate with 57.8%. In 13 food shops and 55 food stalls in Bangkok Thailand, food handlers were found to have good knowledge with only 13.0%. A face-to-face survey method was applied to 580 food handlers in Fong Song region of China to learn their knowledge about food processing and personal hygiene. It was determined that only 1.4% of the respondents got full points. According to scientific researches and surveys; It has been reported that processors should receive training in terms of food safety and food hygiene (Angellilo et al., 2000; Tang and Fong, 2004; Hertzman, J., Barrash, 2007; Cuprasitrit et al., 2011; Kasturwar and Mohd, 2011; Nee and Sani, 2011).

ATTITUDES OF FOOD HANDLERS TO POST-TRAINING FOOD HYGIENE

In the spread of food infections worldwide; It is known that the lack of hygiene in places such as food businesses, canteens, residences and cafeterias plays an important role. The importance of food hygiene education emerges in minimizing these food diseases. Many factors such as the status, behavior and working styles of the employees should be addressed in the trainings. After the trainings, food knowledge, attitudes and practices (KAP) reach the determined points (Myers, 2002; Barrabeig et al., 2010; Rosnani et al., 2014; Abdolmajid, 2015; Mohd Firdaus Siau et al., 2015). According to some studies, it has been reported that after possible training, there will be positive effects on the performance of food handlers through learning. It has been reported that the process towards the expected goal can be interpreted according to the feedback received as a result of the methods used in the training, and after the training, it is assumed that the hygiene status in food is positive and the person who develops himself/herself will also pay special attention to contaminated situations (Ehiri and Morris, 1996; Clayton et al., 2002). In addition, it has been reported in some studies that individuals who previously attended the hygiene course re-joined, and the level of knowledge reached higher levels after participation (Roberts et al., 2008; Park et al., 2010).

CONCLUSION

In our compilation study; important points in food hygiene and food safety resulting from hygiene were mentioned. It was observed that there were positive and negative situations in food hygiene. It is predicted that the results of the training and course studies to be carried out in this field will be positive and that they will go to even more advanced points. In addition, within the scope of the study, the importance of hygiene control, food hygiene and safety knowledge and attitude after education in hygiene was emphasized.

CONFLICT OF INTEREST

No conflict of interest was declared by the authors.

REFERENCES

- Abdolmajid, F. (2015). Assessment of knowledge, attitudes and practices of food workers about food hygiene in Shahrekord Restaurants. *World Appl Sci J*, 33(7), 1113-1117.
- Acharya, S. R., Poudel, S. (2020). Factors Associated with Maternal and Neonatal Health Care Practices : A Study from Nepal. *J Biomed Sci*, 10, 186–192.
- Acharya, S. R., Bhatta, J., Timilsina, D. P. (2017). Factors associated with nutritional status of women of reproductive age group in rural, Nepal. *Asian Pac J Health Sci*, 4(4), 19–24.
- Adams, M., Motarjemi, Y. (1999). Basic food safety manual for health workers. WHO, Geneva; 13-33.
- Angellilo, I.F., Viggiani, N.M.A., Rizzio, L., Bianco, A. (2000). Food handlers and food bornedisease: Knowledge, attitude and reported behaviour in Italy. *J Food Prot*, 63(30), 381-385.
- Barrabeig, I., Rovira, A., Buesa, J., Bartolome, R., Pinto, R., Prelezo, H. Dominguez, A. (2010). Food borne norovirus outbreak: the role of an asymptomatic food handler. *BMC Infect Dis*, 10(269), 1-7.
- Bhattarai, S., Subedi, S., Acharya, S. R. (2018). Factors Associated With Early Menarche among Adolescents Girls : A Study from Nepal. *SM J Commut Med*, 4(1), 2–12.
- Chukwuocha, U.M., Dozie, I.N., Amadi AN, Nwankwo, B.O., Ukaga, C.N., Aguwa, D.C. (2009). The knowledge, attitude and practice of food handlers in food sanitation in ametropolis in Southeastern Nigeria. *East Afr J Public Health*, 6(3), 240-3.
- Clayton, D.A., Griffith, C.J., Price, P., Peters, A.C. (2002). Food handlers beliefs and self-reported practice. *Int J Environ Health Research*, 12(1), 25-39.
- Collins, J.E. (1997). Impact of changing consumer lifestyles on the emergence of and re-emergence of foodborne pathogens. *Emerg Infect Dis*, 3(4) : 471-479.
- Cuprasitrit, T., Srisorrachatr, S., Malai, D. (2011). Food safety knowledge, attitude and practice of food handlers and microbiological and chemical food quality assessment of food making merit for monks in Ratchathewi district, Bangkok. *Asia Pac J Public Health*, 2(1), 2734.
- Ehiri, J.E., Morris, G.P. (1996). Hygiene training and education of food handlers: Does it work? *Ecology of food and Nutrition*, 35(4), 243-251.
- Hertzman, J., Barrash, D. (2007). An assessment of food safety knowledge and practice of catering employee. *Br Food J*, 109 (7), 562-576.
- Ifeadike, C.O., Ironkwe, O.C., Adogu, P.O., Nnebue, C.C., Emelumadu, O.F. (2012). Prevalence and pattern of bacteria and intestinal parasites among food handlers in the Federal Capital Territory of Nigeria. *Niger J Med*, 53(3), 166-171.
- Kaferstein F, Abdussalam M. (1999). Food safety in the 21st century. *Bull World Health Organ*, 77(4), 347-351.
- Kaferstein, F.K., Motarjemi, Y., Bettcher, D.W. (1997). Foodborne disease control: a transnational challenge. *Emerg Infect Dis*, 3 (4): 503-510.
- Kasturwar, N.B., Mohd, S. (2011). Knowledge, practice and prevalence of MRSA among food handlers. *Int J Biol Med Res*, 2(4), 889-894.
- Marci, Z.B., Gary, R.K., NewFields L.L.C. (2002). Medical surveillance of food handlers. SPE International conference on health, safety and environment in oil and gas exploration and production, Kuala Lumpur, Malaysia; paper number 74078-MS.

- Mikkilineni, S. (2016). Essentials of Food Hygiene-1. Book.
- Mohd Firdaus Siau, A., Son, R., Mohhidin, O., Toh, P.S. Chai, L.C (2015). Food court hygiene assessment and food safety knowledge, attitudes and practice of food handlers in Putrajaya. *Int Food Res J*, 22(5), 1843-1854.
- Myers, D.G. (2002). Social psychology. (7th ed.). NewYork: McGraw-Hill.
- Nee, S.O., Sani, N.A. (2011). Assessment of knowledge, attitude and practice among foodhandlers at residential colleges and canteen regarding food safety. *Sains Malays*, 40(4), 403-410.
- Obionu, C.N. (2007). Primary Health Care for Developing Countries, 2nd ed. Enugu:Institute for Development Studies UNEC; Pg 293.
- Okojie, O.H, Wagbatsoma VA, Ighoroge AD. (2005). An assessment of food hygiene among food handlers in a Nigerian university campus. *Niger Postgrad Med J*, 12(2), 93-96.
- Okugn, A., Woldeyohannes, D. (2018). Food hygiene practices and its associated factors among model and non model households in Abobo district, southwestern Ethiopia: Comparative cross-sectional study. *PLoS ONE*, 13(4).
- Park, S.H., Kwak, T.K. Chang, H.J. (2010). Evaluation of the food safety training for food handlers in restaurant operations. *Nutr Res Pract*, 4(1), 58-68.
- Roberts, K.R., Barrett, B.B., Howells, A.D., Shanklin, C.W., Pilling, V.K. Brannon, L.A. (2008). Food safety training and food service employees' knowledge and behaviour. *Food Prot Trends*, 28(4), 252-260.
- Rosnani, A.H., Son, R., Mohhidin, O., Toh, P.S. Chai, L.Y. (2014). Assessment of knowledge, attitude and practices concerning food safety among restaurant workers in Putrajaya, Malaysia. *Food Sci Qual Man*, 32, 20-27.
- Sevindik, M. (2018). Fungal factors in food products deterioration. *Research & Reviews: Res J Biol*, 6(4), 8-11.
- Sevindik, M., Uysal, I. (2021). Food spoilage and Microorganisms. *Turkish JAF Sci Tech*, 9(10), 1921-1924.
- Tang, C.H., Fong, U.W. (2004). A survey of food hygiene and attitude among Chinese foodhandlers in Fong Song Tong District. *Asia Pac J Public Health*, 16(2), 120-124.
- Wheeler, J.G., Seith, D., Cowden, J.M., Wall, P.G., Rodrigues, L.C., Tompkins, D.S. (1999). Study of IID in England: rates in the community, presenting to general practice and reported to national surveillance. *Br Med J*, 318 (7190): 1046-1055.
- WHO (World Health Organisation) (2002). Global strategy for food safety: Safer Food for better health, WHO Geneva, 5-8.
- WHO (World Health Organisation) (2007). Five Keys to Safer Food Manual. Department of food safety zoonoses and food borne diseases, WHO Geneva, 3-21.