

**EXAMINATION OF HYGIENE KNOWLEDGE OF PERSONNEL EMPLOYED IN HOTEL CATERING ESTABLISHMENTS***Ewa Czarniecka-Skubina, Sebastian Skwierczyński**Faculty of Human Nutrition and Consumer Sciences, Warsaw University of Life Sciences*

Key words: hygiene knowledge, personnel, hotel catering industry

The aim of the research was to estimate personnel knowledge of hygiene practices assurance in the catering industry. The research was conducted in a form of a questionnaire among 200 employees of hotel catering establishments.

Over 20% of the respondents were uncertain as to the existence of the HACCP system at their workplace, which may mean that there are not enough HACCP system trainings and that the system does not function properly. The questions concerning the personnel hygiene were answered correctly by most respondents (about 90%). Different answers were given to the question about how often protective clothing should be changed (only 60% of correct answers). The staff's knowledge about ensuring proper hand hygiene was sufficient. The respondents found the part about technological processing most difficult. Many of them were not familiar with correct rules of thawing food (11 persons claimed that thawing food in hot running water is the right method). They knew that thawed meat cannot be frozen for the second time, but 1 of them said it can be kept in cold storage for 5 days after thawing. They were not able to define the safe shelf life dishes. They knew the basic rules of GHP and had no difficulties with answering questions about hygiene assurance in a catering establishment.

On the basis of the conducted research it can be stated that the know-how of the hotel catering staff is not fully satisfactory, especially their understanding of the correctness of food processing. The hygiene employee trainings should be introduced to explain the concepts, principles and idea of GHP, GMP and HACCP systems, and their implementation should be controlled afterwards. Only the personnel's full understanding of hygiene principles guarantees the proper quality of the catering service.

**INTRODUCTION**

A rising tendency to eat out in different types of catering establishments has been observed for many years [Alterkuse *et al.*, 1996]. Results of many research [Wall *et al.*, 1995; Barrie, 1996; Yi-Mei & Ockeraman, 2005] point to a remarkable number of food poisoning cases after eating meals provided by a caterer, in restaurants, social catering and canteens and the like. According to Yi-Mei & Ockerman [2005], 36% of food poisoning occurrences is a result of eating in catering establishments, 25% in restaurants and 14% in hotel restaurants.

Weingold *et al.* [1994] and Coleman & Griffith [1998] indicated improper technological process as the major reason of food-borne diseases after consumption of food in catering.

One of the main aims of the quality policy in modern food processing establishments, including catering, is then to ensure health safety of the served meals. Properly trained staff is crucial to safe processing of food, which means that obligatory hygiene training should be provided for them. Another very important issue is the frequency of trainings, types and ways of topic presentation, as well as the control of how newly acquired knowledge is used in practice.

The aim of the present research was to estimate the real state of personnel awareness of hygiene practices in hotel catering establishments.

**MATERIAL AND METHODS**

The research was conducted in the form of a questionnaire among 200 hotel catering employees, in five chosen hotels, rated 2\*, 3\*, 4\* and 5\* (Figure 1). The chosen hotels were recommended by the Polish Hotel Association. Management of the studied hotels gave the permission for staff examination. All the personnel of the hotel catering establishments were studied. The questionnaire comprised 32 questions related to personal hygiene of the staff, hygiene of foodservice areas, food processing hygiene, HACCP system and its appli-

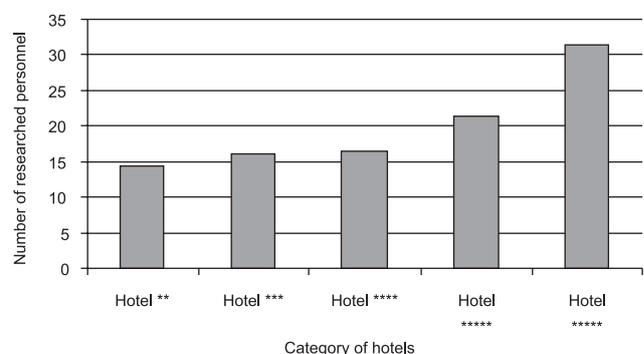


FIGURE 1. The number of respondents in chosen hotels.

cation in the hotel, and hygiene training sessions. There could be only one correct answer to each question. The research was preceded by a sounding survey to avoid mistakes when preparing the questionnaire. Twelve persons took part in the survey, which included personal information, such as age, sex, education, and occupation.

The examined group was mainly composed of people directly involved with food processing and handling, *i.e.* cooks, cooks assistant, pastry chefs, and managers, *e.g.* kitchen shift managers. The sex structure of the group was balanced, about 50% of men and women took part in the survey. They were mainly persons under 40 years of age (85%) that had technical or high school catering education (70.5%), and who held a position of a cook or cook assistant, or kitchen shift manager (Table 1). The statistical analysis of the results was performed using the statistical software Statistica PL for Windows 5.5.

## RESULTS AND DISCUSSION

In all of the examined hotels the HACCP system has been implemented – the system of ensuring quality and safety of produced meals. However, as many as 15.5% of the respondents never heard of this system, and among them the kitchen staff members (cooks and cook assistants) were remarkably even less aware of its existence ( $p=0.000001$ ). In addition, 22% of the employees expressed their doubts as to whether the HACCP system is implemented in their workplace. Remarkably more 5 star hotel employees were of that opinion ( $p=0.00001$ ). It may mean that this topic is discussed too superficially at training sessions, as well as that there are some irregularities in the system's application. It is quite interesting, as 90% of the respondents, irrespective of the hotel rank ( $p=0.10297$ ), claimed that they had attended classes that covered hygiene issues. It should be mentioned here that hoteliers in Poland are united in various hotel associations that organize training courses. What is more, the hotel categorization

and recommendation system requires constant improvement of hotel staff qualifications. Many respondents, when asked about the purpose of hygiene-sanitary training, said that it is a legal requirement that aims at raising their hygiene knowledge level. Some (12.5%) answered that it is supposed to reduce the risk of food contamination.

Martinez-Tomé *et al.* [2000] state that an increasing number of training courses covering the subject of GMP and HACCP system, which would elaborate on the practical issues of providing microbiological quality of food, results in an improvement of hygiene-sanitary conditions (decreases amount of microorganisms in salads) in catering establishments under examination.

### Personal hygiene awareness of hotel staff

Most of the kitchen work in catering establishments involves direct contact of the employee with food. Fulfillment of the personal hygiene requirements constitutes the main condition that needs to be met to achieve a high level of health safety of processed food. The purpose of assurance of personal hygiene of the staff is to exclude a human as a carrier of pathogenic factors [Kołozyn-Krajewska, 2003]. The employees of food processing establishments are legally obliged to comply with personal hygiene regulations, to wear protective clothing and to be in good health condition. Proper personal hygiene practices can remarkably reduce the occurrence of food poisonings among consumers [Curtis *et al.*, 2000; Aiello & Larson, 2002].

The respondents understand that personal hygiene of the catering staff means clean hair, clean hands, and short nails with no nail varnish on, washed body and clean protective clothing (92.5% of correct answers). They are aware of the purpose of medical examinations, such as germ carrier tests, but they find it difficult to specify the right frequency of such tests (77% of correct answers). In turn, 98% of the respondents know that a person who is diagnosed with bacteria of *Salmonella* should not work with food.

Many different answers were given to the question of how often protective clothing needs to be changed. There were 60% of correct answers, which is due to the fact that the frequency of changing protective clothing depends on the type of performed work. Also, many establishments expect their employees to change clothes once a day only for the sake of economy. As shown by analyses, 98% of the respondents know that headgear is an indispensable element of working clothes.

In the catering industry manual work is most common, which explains why hand hygiene practices are so important. According to Kiper & Street [2005] the key to assurance proper food safety is to comply with hand cleaning rules, which include: frequent washing and disinfection of hands, and wearing one's nails short, clean and not varnished. As indicated by De Wit & Kampelmacher [1984], 60% of catering employees do not wash their hands properly, although they should keep their hands clean and avoid direct contact with food whenever possible.

Most of the respondents (90%) know after which work activities they should wash their hands. As a potential danger during food handling process they mentioned false nails (33% of answers), and all kinds of hand adornment – rings,

TABLE 1. Characteristics of the respondents.

Group characteristics	Group	n	%
Total	-----	200	100
Sex	Women	91	45.5
	Men	109	54.5
Age (year)	18-25 of age	57	28.5
	26-30 of age	59	29.5
	31-40 of age	56	28
	over 40	28	14
Education	Elementary	3	1.5
	Technical Catering	57	28.5
	Technical other than catering	33	16.5
	High school catering	75	37.5
	High school other than catering	18	9
	Higher catering	13	6.5
Occupation	Higher other than catering	1	0.5
	Cook	123	61.5
	Cook assistant	29	14.5
	Kitchen shift manager	9	4.5
	Expedition worker	4	2
	Pastry chef	8	4
	Waiter	17	8.5
	Manager	8	4
Trainee	2	1	

false nails, *etc.* (63.5%). They defined the most effective way of washing hands as the act of washing and disinfection and drying hands with a paper towel (84.5% of respondents). Only 8% of them claimed that it is sufficient to wash hands with soap only and, after rinsing, to dry them with a paper towel, whereas 5.5% chose the option of drying hands with a cotton towel.

The research conducted in 2002 by the Food Safety Authority of Ireland among the employees and owners of catering establishments in Ireland and Great Britain, shows that the issue of securing the right hand hygiene is still causing problems nowadays. It is probably due to shortage of permanent employee training. The research showed that about 50% of the employees declare to have basic, documented (training course) knowledge about food hygiene. Only 35% of the owners thought that an appropriately trained employee is important to the proper performance of the establishment. Only 23% of the owners believed in the efficiency of GHP in comparison to 64% of those, who claimed that the key to retain a customer is good food served by the establishment [www.fsai.ie, 2005].

The researched employees were familiar with the regulations concerning the proper hand hygiene, they did not know however, how to proceed in the case of a cut, 56.5% said to protect it with a plaster if possible and gloves. They understood that in the case of extensive purulent condition of hand skin one should not work and such an employee should be removed from a position where contact with food is required.

Many researched employees (72.5%) knew that they are not allowed to take meals during working time, but 26% would probably do that if they had no break at work. Statistically, it was more often the choice of respondents employed as chefs and waiters. It is common knowledge that taking meals at catering establishments is allowed only in specified areas (staff room).

### Knowledge of hygiene in foodservice areas of catering industry

An important sanitary aspect is not only the personal hygiene of the employees, but also keep of hygiene regulations during food processing. Three questions in the questionnaire (test) related to disposal of postproduction waste (Table 2). As it can be seen from the results, over 90% of the respondents proved to know the properties of a proper waste container, as well as the frequency with which it should be emptied and disinfected. Waste containers, even though they do not have contact with food, might contain food remnants, which are a good breeding ground for microorganisms.

Due to the fact that one of the main reasons behind food contamination during the production process is a bad hygiene-sanitary state of the foodservice areas, equipment and appliances, but also incorrectly performed cleaning and disinfection, a part of the questionnaire was devoted to washing and disinfection practices (Table 3). It seems that the examined personnel is familiar with these practices, as all their answers were correct, except for one, which concerned the storing place for detergents and disinfectants (15.5% said it is not protected).

To sum up, the examined personnel found no difficulties when answering questions relating to hygiene practices in

TABLE 2. Answers connected with disposal of post production waste.

The best type of waste containers		Respondents answers (%)
1	Lid operated manually	5
2	Open at all times	1
3	Lid operated with a food pedal, pedal bin	92.5
4	No answer	1.5
Frequency of emptying a waste container		
1	Once a day	3
2	Twice a day	3
3	Immediately after filling	94
Frequency of disinfecting a waste container		
1	Once a day	9.5
2	Not at all, as no direct contact with food	0
3	Each time after it is emptied	90.5

TABLE 3. Answers connected with cleaning and disinfection process.

Places of storage of detergents and disinfectants		Respondents answers (%)
1	Anywhere, within easy reach	3.5
2	In specified, designated, closed place	43
3	At each workstation	12
4	No answer	42
Efficiency of unprofessional cleaning products used for cleaning and disinfection of surfaces in catering industry		
1	Sufficient	10.5
2	Not sufficient	88.5
3	No answer	1
Type of surface that requires disinfection		
1	In direct contact with food	75.5
2	Floor	7.5
3	Windows	17
Parameters that influence the efficiency of cleaning and disinfection process		
1	Concentration of the disinfectant	3
2	Time of exposure to the disinfectant	10
3	Temperature of the disinfectant	2
4	Concentration, exposure time and temperature of the disinfectant	83
5	No answer	2

foodservice areas of a catering establishment. However, the employees were not able to distinguish between clean and dirty zones and could not tell which area belongs to which zone. No knowledge in this matter may result in the employees moving from one zone to the other at their liberty, causing safety hazard to the processed food.

### Knowledge of food processing in catering industry

Most problematic part of the questionnaire related to hygiene regulations during meal preparation. Many of the respondents proved not to be familiar with principles of food

thawing. It is very disturbing that 11 persons (5.5%) chose thawing food in hot running water to be the proper method. The employees know, however, that thawed meat should not be frozen for the second time. Still, 22% of them claimed to keep thawed meat in cold storage for 5 days.

Two questions in the questionnaire concerned the personnel awareness of hazard related to eggs in catering technology. Most of the respondents (98%) know that eggs can be the source of *Salmonella* and should be disinfected, which can be done in different ways, by irradiation, washing and parboiling, as well as by chemical disinfection.

Proper hygiene during technological process depends on complying with the rules of heat processing. The respondents know what is the purpose of measuring temperature inside of a product (87%). Few of them (3.5%) could not give a correct answer when asked about what temperature should be achieved inside of a product (poultry) during heat processing. The employees were also not able to define safety shelf life dishes, those that underwent heat processing and those that had not (only about 60% of correct answers). No statistically significant correlation was observed between the correctness of answer and type of occupation ( $p > 0.05$ ).

Knowledge deficiencies of the examined personnel, as well as the apparent discrepancy between theoretical hygiene knowledge and its practical use, an issue pointed to by Fuks *et al.* [2004], lead to the conclusion that permanent trainings is needed in order to increase the personnel awareness of the subject of food hygiene. Courses that would cover hygiene issues should help the employees understand the importance of compliance with the hygiene regulations and realize the effect of incorrect practices on product safety. This kind of training would also result in a remarkable decrease of food poisoning risk, as the employees would learn how to recognize the factors lying behind lower quality, especially health quality of food, and how to eliminate and prevent their occurrence.

## CONCLUSIONS

On the basis of the present research it can be stated that knowledge level of the personnel of hotel catering establishments is average. Their familiarity with proper food processing principles is not fully satisfactory. There is a need for trainings explain the values, concepts and ideas of GHP and GMP and the HACCP system. It is also crucial to control their practical application in the catering establishments. Only full un-

derstanding of hygiene rules can guarantee proper quality of catering service and safety of the produced meals.

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## **OCENA WIEDZY Z ZAKRESU HIGIENY PERSONELU ZATRUDNIONEGO W ZAKŁADACH GASTRONOMII HOTELOWEJ**

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Celem badań było określenie wiedzy personelu z zakresu zapewnienia higieny w gastronomii. Badania przeprowadzono metodą ankietową wśród 200 pracowników zakładów gastronomii hotelowej.

Ponad 20% badanych pracowników miało wątpliwości czy w zakładzie funkcjonuje system HACCP, co świadczy o braku szkoleń, a także nieprawidłowym funkcjonowaniu tego systemu. Na pytania związane z higieną personelu pracownicy w większości (około 90%) odpowiadali prawidłowo. Wiele rozbieżności uzyskano na pytanie dotyczące częstotliwości zmiany odzieży ochronnej (tylko 60% poprawnych odpowiedzi). Pracownicy posiadali wystarczającą wiedzę na temat zapewnienia właściwej higieny rąk. Najwięcej kłopotów badanym sprawiały pytania związane z prowadzeniem procesów technologicznych. W przypadku wielu osób stwierdzono brak wiedzy dotyczącej prawidłowych zasad rozmrażania żywności (11 osób wskazało na rozmrażanie żywności pod bieżącą, gorącą wodą jako prawidłowy sposób). Pracownicy wiedzieli, że nie wolno ponownie zamrażać rozmrożonego mięsa, ale 1/4 badanych wskazywała na możliwość jego przechowywania w chłodni po rozmrożeniu do 5 dni. Nie potrafili określić bezpiecznego czasu przechowywania gotowych potraw. Znano podstawowe zasady GHP i nie było problemów z odpowiedzią na pytania dotyczące zapewnienia higieny w pomieszczeniach zakładu gastronomicznego.

Na podstawie przeprowadzonych badań stwierdzono, że poziom wiedzy personelu zakładów gastronomii hotelowej nie jest w pełni satysfakcjonujący, zwłaszcza w zakresie dotyczącym prawidłowości prowadzenia procesu przygotowania potraw. Na szkoleniach należałoby wyjaśnić pracownikom pojęcia, zasady i istotę GHP, GMP oraz systemu HACCP, a następnie kontrolować ich praktyczne zastosowanie. Tylko rozumienie zasad higieny przez personel zagwarantuje właściwą jakość usługi gastronomicznej.