



Development of conscious food handling in Hungarian school cafeterias



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ARTICLE INFO

Article history:

Received 14 June 2016

Received in revised form

7 September 2016

Accepted 8 September 2016

Available online 8 September 2016

Keywords:

Food hygiene
Training method
Food handlers
School canteens
Consciousness
Food safety

ABSTRACT

The last steps of food chain are particularly important, because this is when the food products reach the consumer. In the catering sector, the responsibility of food handlers are very high in the prevention of foodborne diseases. In this situation, the food handler's work must be conscious. This paper focuses on the issue of consciousness in food handling, which is the relationship between the level of knowledge and the implementation of right practice. The aim of this study is to establish a special food hygiene training model and measure its efficiency. The essence of the training model is to increase the consciousness of food handlers.

Food hygiene training was tested at 33 school kitchens, where 145 staff participated. The program lasted for 6 months. Theoretical knowledge was evaluated, using self-administered tests, and food handling practice was measured through observation. Results before and after the intervention program were compared.

Deficiencies in hygienic knowledge and in food handling practice were identified in seven areas. Significant increases were observed in theoretical knowledge in the areas of receiving (33.5%) and food waste (11.7%). With regards to the food handling practice, some remarkable positive changes were observed in the fields of storage (33.3%), dishwashing (24.7%), and cleaning (22.0%). Dishwashing, personal hygiene, and cleaning were the areas where such increases were observed, both in their knowledge and practice, that is, consciousness was increased in these areas.

The parallel development of hygienic knowledge and food handling practice increased the consciousness in food handling, which is indispensable for ensuring safe food practices. Increasing consciousness make good practice instinctive in everyday work.

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1. Introduction

Foodborne diseases caused by hygienic contaminations or infections are significant in the catering sector. These types of diseases have considerable effect on the morbidity and mortality indices worldwide (McIntyre, Vallaster, Wilcott, Henderson, & Kosatsky, 2013). In the contract catering sector, the responsibility of food handlers is crucial with regards to the supply of hygienic and safe foods (Greig, Todd, Bartleson, & Michaels, 2007). It is estimated that food handlers are responsible for 97% of all outbreaks of foodborne diseases in the catering sector (Egan et al.,

2007). Food handlers' hands may be the carrier for harmful microorganisms, and thus may cause cross-contaminations or spread harmful microorganisms due to possible gastro-intestinal infectious diseases of the food handlers (Abdul-Mutalib et al., 2012). Moreover, they will stay away from work less in case of illnesses when compared to the workers in healthcare, although the risk of spreading infections is similarly high in food handling (McIntyre et al., 2013). Occurrence of infections caused by microorganisms can be reduced through appropriate personal hygiene, including hand hygiene.

It has been observed that despite the regular food hygiene training of food handlers, incidence of foodborne diseases is still significant. This was caused mainly by inadequate food handling practices. Knowledge obtained is often not applied in practice (Ehiri, Morris, & McEwen, 1997). Although several reports indicate towards the failure of formal courses, researchers uniformly

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conclude that food hygiene education programs should be encouraged (Seaman & Eves, 2006). Several reasons may be why training programs are not effective. In several countries, the implementation of regular food safety training programs for food service workers is obligatory, however, its effectiveness are not evaluated, and food handlers are not motivated to apply their gained knowledge in practice (Park, Kwak, & Chang, 2010; Seaman & Eves, 2010). Thus, there is a need to increase the efficiency of trainings. An efficient training program should focus not only on theoretical knowledge but on food handling practice as well (Soares, García-Díez, Esteves, Oliveira, & Saraiva, 2013).

In Hungary, 17 outbreaks and 1467 cases were reported in the contract catering sector in 2014, which is extremely high compared to the previous years (2013: 702 cases; 2012: 519 cases). Data from previous years show an increasing tendency about the number of reported cases in contract catering sector (National Food Chain Safety Office, 2014).

In Hungary, the daily intake of primary school children should be 2200–2500 kcal containing different types of nutrients and 60% of that is consumed during school time when children take three meal at the school. During the most active years of their physical and mental development, children's nutrition is consigned to the service of catering company. Moreover, their immunity is lower compared to adults, so risks of food borne disease are significantly higher. Therefore, school catering is considered to be of great importance worldwide. Healthy nourishment of children is beneficial, not only for their physical development but also for their cognitive abilities and behaviour (Cámara, Amaro, Barberá, & Clemente, 2005; da Cunha et al., 2013; Garayoa, Díez-Leturia, Bes-Rastrollo, García-Jalón, & Vitas, 2014). In Hungary, the direct costs of school meals are paid by the parents, but the additional costs are paid by the owner institutions. Based on specific social circumstances, parents may apply for state support for daily school meals.

School meal services often operate from serving kitchens. Serving kitchens are characterized through their isolation, where there is no daily contact between the individual kitchens, and consequently, the exchange of knowledge, where the development of skills can be deemed as occasional. In case of cooking kitchens, the outlook of the catering managers is significantly better and more conscious (Wilson, Murray, & McKenna-Black, 2001). In Hungary, professional qualifications are not a prescription for serving kitchen staff, and therefore, risks arise from a lack of knowledge, which significantly affects this field.

For risk reduction in a food service facility it is not enough to improve physical facilities, but human resources should also be improved (García Martínez, Poole, Skinner, Illés, & Lehota, 2006). Improving food safety means improving the food handlers' behaviour (Yiannas, 2009, pp. 39–47).

The aim of this study is to evaluate the knowledge, attitude, and practice (KAP) of the food handlers in Hungarian school catering sector. Furthermore, this is required to develop and implement a systematic training program based on the results of this evaluation, and to measure the efficiency of the program as well. The research

focuses on the issue of consciousness, and its effect on food safety.

2. Materials and methods

The project was carried out in 33 school kitchens of Budapest, Hungary. The kitchens were being operated in primary and secondary schools. The schools were selected from almost all districts of Budapest. Forty schools were selected, and 33 agreed to take part in the intervention program. Out of them, 13 were cooking kitchens and 20 were serving ones. At these cooking kitchens about 7–9 workers were employed, while the serving kitchens had about 1–3 workers. About 9000 portions were served at the 33 kitchens each day. At the cooking kitchens, meals were prepared on the spot, while, at the serving kitchens meals were delivered, and only service was carried out on site. HACCP system was already implemented in all units.

In the preparatory phase, the observation points for food handling practices and a questionnaire for knowledge assessment were defined. Expert group were set up with three food safety engineers and three food hygiene and HACCP advisor, where all of them had more than 10 years' work experience. The expert group was trained for one week before the intervention program. Monitoring teaching and training were provided by them. The duration of the project was 6 months, and kitchens were visited 6 times altogether, once per months. The first visit was intended to assess the situation at the school canteens. Education and training was done during four visits, and an evaluation of the intervention program was scheduled at the 6th visit (Table 1).

2.1. Assessment and development of theoretical knowledge

To assess the theoretical knowledge, multiple choice tests (true-false or selecting from 4 or 5 answers) were applied (Questions are listed in Supplementary material 1). The questionnaires were developed, based on previous works (Jevšnik, Hlebec, & Raspor, 2008; Pichler, Ziegler, Aldrian, & Allerberger, 2014; Tóth & Bittsánszky, 2014), and on the content of Good Hygienic Protocol effective in Hungary (Zoltai et al., 2013). The questionnaire comprised of 34 questions related to 7 subjects (Table 2). Additional information related to the respondent's gender, age, qualification and number of years in a food business were also collected. Results were given as a percentage of the maximum scores (34 = 100%). Questionnaires were evaluated by the experts and previously tested at 3 kitchens by 26 food handlers. We tried to schedule test writing sessions (1st and 6th visits) for afternoons, in order to avoid necessary interruptions in the working processes. Storage was evaluated only at the level of cooking kitchen workers (n = 99).

2.2. Assessment and development of practice

The practices used at the kitchens were evaluated with the aid of a checklist (Supplementary material 2) filled by food hygiene experts on the spot. Information was collected through direct observation. The checklist was developed based on previous works (da

Table 1
Phases and schedule of the training project.

Phases	Knowledge	Practice	Theme
1.	Knowledge survey	Practice monitoring	Monitoring and survey of deficiencies
2.	Theoretical and practical knowledge training		Dishwashing, cleaning and food waste
3.	Theoretical and practical knowledge training		Receiving and storage
4.	Theoretical and practical knowledge training		Distribution and personal hygiene
5.	Theoretical and practical knowledge training		Monitoring and eliminating residual deficiencies
6.	Knowledge survey	Practice monitoring	Monitoring and survey of improvement

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