



Implementation of Food Safety Management Systems in small food businesses in Cyprus



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ABSTRACT

EU legislation requires that food businesses in all member states must implement a Food Safety Management System based on HACCP principles. Although manufacturers have used this system successfully for many years it has been less common in small and medium sized enterprises (SMEs), especially those in the food service sector. There are considered to be a number of barriers which small businesses find particularly difficult to overcome. This study assesses the impact of various Food Safety Management Systems in 50 small businesses in Cyprus. It compares food hygiene before, during, and after implementation of the food management systems, assesses the attitude of the Food Business Operators and the hygiene knowledge of the staff. Results show that the maximum improvement came when implementing the pre-requisite programmes and a bespoke HACCP plan but that a deterioration in standards could be identified when using more complex systems such as the CYS 244 standard or ISO 22000. Food Business Operator attitude started positively but became more negative as the complexity of the Food Safety Management System increased.

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1. Introduction

1.1. Background

The implementation of Food Safety Management Systems (FSMS) in small and medium food businesses can be problematic owing to barriers and limitations which, although common to all food businesses, appear to be particularly challenging for this category (Mensah & Julien, 2011; Yapp & Fairman, 2006). EU legislation requires that all Food Business Operators implement a system based on HACCP principles (Article 5, Regulation (EC) 852/2004). All member states must comply with this requirement. For accession countries joining the EU, this requirement can represent a challenge to the existing food industry and control authority alike. Cyprus joined the EU in 2004 and according to the Statistical Service of Cyprus (Anonymous, 2005) 95% of businesses in Cyprus have 0–9 employees. Food businesses in Cyprus tend to be independent and owned by one person or a family, with 97.3% classed as small-medium sized i.e. employing less than 50 people (Violaris, Bridges, & Bridges, 2008). This business profile suggests that the Cypriot

Food Industry might face some difficulties in complying with the EU legislation. Violaris et al. (2008) estimated that only 17% of food businesses in Cyprus had implemented HACCP and that more than half (55%) of the small businesses did not know what HACCP was. To assist the food businesses comply with the EU regulations, the Cyprus Government organized a system of external consultancy companies. These companies offered mandatory assistance to the food industry to enable compliance. Fees were charged to the business for the consultancy service which included basic food hygiene and HACCP training, an initial diagnostic visit to identify areas for attention, subsequent visits to provide advice on structural and procedural matters and assistance in developing and implementing a bespoke HACCP plan.

1.2. Food safety management in Cyprus

On becoming a member of the European Union in 2004, food businesses in Cyprus were required to comply with the Council Directive 93/43/EEC on the Hygiene of Food stuffs. This contained a requirement for food safety management based on HACCP but allowed some flexibility in the interpretation, reflecting the nature and size of the food business. At this time there also existed in Cyprus a national HACCP standard, the CYS 244 standard,

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(Anonymous, 2001a) based on the Greek national standard ΕΛΟΤ 1416 (Anonymous, 2000). The CYS 244 standard required implementation of pre-requisite programmes and the seven principles of HACCP in full, including documentation. It represented a more prescriptive standard than that detailed in the Council Directive 93/43/EEC on the Hygiene of Food stuffs, and was, at the time of accession, optional for the restaurants in Cyprus. HACCP certification was available to any food business that could demonstrate compliance with both the EU legislation and the CYS 244 standard through third party audit. Such certification was not required by EU legislation but, after accession, was demanded by the Cypriot Government for all food businesses, including food service, thereby creating an enhanced standard for the Cypriot Food Service sector. In 2006 the CYS 244 standard was withdrawn and food enterprises were expected to comply with the new international standard, ISO 22000. This standard requires implementation of the pre-requisite programmes and the seven principles of HACCP plus interactive communication and structured management standards. ISO 22000 is supported by technical standards and requires third party audit to retain accreditation. These policy changes and the continual enhancement of standards provided an additional challenge for the Cypriot food industry and the private consultants also provided training and advice on how these could be implemented.

As the implementation of Food Safety Management Systems in parts of the food industry had been optional in Cyprus prior to accession, but obligatory afterwards, there existed a unique opportunity to follow a sample of food businesses through the process of implementation and assess the impact on them.

The aim of the research was to test whether hygiene in the study group premises was improved during the implementation of Food Safety Management Systems. Data was also collected on a number of other parameters, including the hygiene knowledge of staff, the attitude to FSMS, the compliance of food, environmental and water samples from the premises and the cost of FSMS implementation. This information was used to assess the attitude and opinions of the Food Business Operators and staff about Food Safety Management Systems.

2. Materials and methods

2.1. Study group

The project was a longitudinal study which took place between October 2005 and April 2008. One member of the research team was at that time employed in the consultancy scheme described above and was responsible for providing comprehensive support and training to food businesses in the process of implementing HACCP. The study recruited an opportunistic sample that comprised all those premises allocated to the researcher in 2005. The food businesses had all formally applied for the consultancy support. Implementation of a Food Safety Management System was a legal requirement and Food Business Operators in Cyprus were required to comply or face possible closure of the business. The consultancy scheme was a government supported with universal uptake by the businesses. This made the inclusion of a matched control group in the study impossible. The sample group included restaurants, fast food enterprises, catering premises, traditional tavernas, confectionaries, meat products premises and bakeries, reflecting the range of businesses trading on the Island of Cyprus. The participants were located in all areas of the Island and none had more than 21 employees. These characteristics indicate that the composition of the sample group was representative of the food businesses in Cyprus. In total fifty volunteer SME's were recruited to participate in the study. Cochran's equation (confidence level 95% and precision 10%) identified a minimum sample size of 45

premises (Cochran, 1977). During the study each business was provided with support from the consultancy scheme. This support covered training and implementation. Between stage 1 and 2, participants received introductory training in food hygiene and HACCP and assistance to implement the pre-requisite programmes, including the development of a sampling plan. After stage 2, they were given training in the principles of HACCP, assistance in developing a HACCP plan and the use of food hygiene guides to assist compliance. After stage 3 the CYS standard was introduced and after stage 4 participants were trained in the details of ISO 22000.

2.2. Ethical consideration

All Food Business Operators were fully informed of the purpose of the study which was designed to run alongside the implementation of their system. The voluntary nature of their participation and how the data would be anonymised and used was explained. After discussing the matter they were given the option to participate or not. All 50 allocated in 2005 agreed to participate.

2.3. Audit

Premises hygiene was assessed using an audit tool developed for the purpose. The audit was developed after consideration of standard hygiene criteria such as those listed in official control audits (EFET, 2004) published audit sheets (Smith, Hunedy, & Anvarian, 2004). The criteria were assessed by visual inspection or through consideration of documentation, for example temperature monitoring records. The contents of the audit sheet were evaluated by experts from Academia and from the Control Authorities. The final audit consisted of 175 observations, each of which could be answered as 'yes' or 'no'. The questions were worded in such a way that a 'yes' answer indicated a good hygiene practice while a 'no' answer indicated poor hygiene practice, for example 'are hand washing facilities supplied with paper towels or other hygienic means of drying hands?' 'Yes' indicates the premise is hygienic in this matter while 'no' indicates it is not. Every 'yes' answer was allocated one point; every 'no' was allocated 0. The final score for each premises was calculated by summing the points. The maximum score a premises could achieve was 175, the minimum was 0. The audit required approximately 1.5 h to complete, depending on the size of the premises. The outcome of the audit was a numerical score. The higher the score, the better a premises complied with the requirements of the audit. The audit was divided into five parts: Part A: Structure and Facilities, Part B: Cleaning and Disinfection, Part C: Production and Process Control, Part D Sampling and Part E: HACCP implementation. The audit tool was validated by the test-retest method in 19 premises and scores were analysed using the Mann Whitney U test. There was no significant difference in the scores between validation visits to the same premises ($p > 0.05$) or between different researchers.

2.4. Food hygiene knowledge

Staff working in the study premises were assessed on the level of their knowledge of food hygiene at each of the five visits noted in Section 2.7. This was achieved by designing a test which covered basic food safety and hygiene knowledge. The test comprised multiple choice questions and other assessments based on selecting pictures, completing sentences and providing definitions. The questions asked about personal hygiene, cleaning and sanitation, pest control, temperature control and cross contamination. Some questions related to HACCP principles and terminology and hazard identification. All staff working in the participating premises

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