



Knowledge of food safety and food handling practices amongst food handlers in the Republic of Ireland



Nora A. Moreb^a, Anushree Priyadarshini^{b,*}, Amit K. Jaiswal^a

^a School of Food Science and Environmental Health, College of Sciences and Health, Dublin Institute of Technology, Cathal Brugha Street, Dublin 1, Ireland

^b School of Business, University College of Dublin, Belfield, Dublin 4, Ireland

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ABSTRACT

Food safety concerns have existed for a long time, as millions of people across the globe suffer from food borne disease every year. Contamination of food owing to limited knowledge of food safety practices primarily increases the risk of food borne illnesses. In the present study, quantitative research was carried out to gauge the level of food safety knowledge amongst people living in Ireland. A total of 1069 participants from all over the Republic of Ireland contributed to the survey (of which 821 were included in this research). Results showed that the residents of Ireland overall had an average level on knowledge of food safety practices (67.0% passing rate). They had an average level of knowledge in food storage (52.8% passing rate), usage and maintenance of the kitchen facilities (59.0% passing rate), and personal hygiene (61.0% passing rate). Conversely, they had a critically low level of knowledge in food handling (10.8% passing rate) and food poisoning (20.1% passing rate). The results of the present study also showed that, the level of knowledge of food safety practices varies amongst the residents based upon their gender, age, place of residence, education level, and marital status, while no significant difference in the knowledge level was observed based upon their per capita income. The study thus, highlights that there is scope for improvement for the residents to advance their knowledge of food safety practices. Therefore, it can be recommended that researchers, educators, food safety communicators, and the media can engage in educating the population, to help the residents advance their food safety knowledge to safer food practices.

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1. Introduction

Foodborne illnesses are a burden globally to public health and to a nation's economy (Copenhagen, 2015; Young & Waddell, 2016). In the Republic of Ireland, the numbers of foodborne cases have been rising for the fifth consecutive year in 2015 according to data collected nationally as part of the EU Zoonoses regulation (Health Protection Surveillance Center HPSC, 2016). Vulnerable groups are the most exposed to the risks of foodborne illnesses (World Health Organization WHO, 2015a & WHO, 2014), because their immune systems are not fully capable of fighting off infections (Food and Drug Administration FDA, 2016a & FoodSafety.org). A large percentage of the population in Ireland can be categorised as vulnerable, with older adults “65 years old and older” and younger children of “14 years old and younger” (13.38% and 22.24%,

respectively), compared to the general population (Central Statistics Office CSO, 2016) increasing the risk of foodborne incidents.

Research has shown that the increase in foodborne illnesses could be linked to improper food safety practices in homes, as home environments can harbour an array of foodborne pathogens (Langiano et al., 2012; Mountjoy, 2014; Young & Waddell, 2016), such as bacteria, viruses and fungi (Byrd-Bredbenner, Berning, Martin-Biggers, & Quick, 2013; National Health Services NHS, 2014). Furthermore, due to home kitchen being used as a “multi-purpose area” for more than just food preparation; this increases the risk of food contamination, proliferation, and possible foodborne illnesses (Byrd-Bredbenner et al., 2013; NHS, 2014). According to WHO, Campylobacter, Salmonella and *E. Coli* are the most common foodborne pathogens that affect millions in the world (WHO, 2015b), including in the Republic of Ireland (HPSC, 2016). While prior research shows that improper handling, preparation, and storage of food can cause foodborne illness (USDA, 2016a), evidences support that in most cases, proper cooking or

* Corresponding author.

E-mail address: anushree.priyadarshini@ucd.ie (A. Priyadarshini).

processing can eliminate the risk of foodborne illnesses (USDA, 2013). The most common source of food in Ireland are home cooked meals made from scratch using fresh ingredients increasing the importance of being vigilant about knowledge of food safety practices (Healthy Ireland Survey, 2015).

Recent studies have investigated people's knowledge of food safety in many countries around the world, while in Ireland in 2001, a study was conducted testing the pathogenic foodborne bacteria in domestic kitchens within 25 homes. A total of 325 sampling sites, which included sampling before and after preparing chicken and six sites around the house, results showed that contamination was still found after the preparation of meals, increasing the need for consumer awareness and knowledge in food handling and hygiene (Gorman, Bloomfield, & Adley, 2002). Another study that was conducted in Ireland was in 2005, the study was to test the knowledge of 1025 participants from the Irish residents using a questionnaire, the findings of the research is that the majority of the Irish residents have a good base of food safety knowledge, however, that did not translate to the adherence to food safety practices, and knowledge on food poisoning was at a low level (McCarthy et al., 2007). Lastly, in Ireland in 2006 a study that tested the knowledge of food safety amongst 200 of chefs and catering manager was conducted through face to face interviews, the results showed that although they were aware of basic knowledge in order to deliver safe food that followed the law, they still needed extra training to further their knowledge to implement food safety effectively (Bolton, Meally, Blair, McDowell, & Cowan, 2008). While the number of foodborne incidents are still increasing (HPSC, 2016), current studies to assess the public's knowledge in the Republic of Ireland does not exist.

Therefore, the aim of this study is to contribute to the existing knowledge to tackle the reasoning behind the increasing foodborne incidents by giving an updated insight on the assessment of knowledge of people living in the Republic of Ireland on food safety and their practices on preparing food at home. The study will compare demographics based on their level of knowledge of food safety practices and also to determine common areas of weakness. This research can help practitioners and researchers in identifying the areas of weakness of the residents for furthering research in the areas needed. It can also aid the educators, food safety policy makers and food safety communicators on where the knowledge is lacking in the Irish residents. The study will achieve the objective by surveying the residents in multiple regions and analysing and comparing the results.

2. Materials and methods

2.1. Questionnaire design

A questionnaire was designed with multiple-choice questions to survey the public in the Republic of Ireland for their knowledge of food safety practices. It follows a validated questionnaire (Gong, Wang, Yang, & Bai, 2016) developed and used for conducting similar studies. Appropriate modifications were made to the questionnaire to fit the popular habits and traditions of consumers in Ireland. It was also simplified to make it easier for the participant to answer, as according to McLeod (2014), questionnaires should be simple and easy for the surveyor to understand and aimed to address the concerns of the research.

The questionnaire comprised of 32 multiple-choice questions. It was divided into two sections. The first section consisted of six questions that covered the demographics of the individuals being surveyed, such as gender, age, place of residence, per capita annual income (in Euros), educational level and marital status. The second section tested their knowledge of food safety handling in domestic

kitchens, which consisted of 26 questions with a total of five subsections that tested knowledge of food storage with six questions, knowledge of food handling via four questions, knowledge of the usage and maintenance of kitchen facilities through six questions, knowledge of personal hygiene with five questions and knowledge of food poisoning via five questions. Once the design of the questionnaire was established, it was pilot-tested amongst food safety and business management professionals to ensure accuracy, and adjustments were made to enhance the survey based on the feedback received.

2.2. Target participants

The target participants of the study were the people that reside in the Republic of Ireland, with the restrictions that they were over the age of 18, speak English in order to understand the survey, and handle food in their domestic kitchen to test their knowledge of food safety practices.

2.3. Data collection

McLeod (2014) highlights that surveys are a useful tool to obtain a high volume of information from a large number of people in an efficient way and in a short period of time. In order to assure coverage in multiple areas on the Republic of Ireland, a survey was conducted across the Republic of Ireland. The participants were selected at random and were approached both in person with a print version of the survey or an electronic link to the survey was sent out for participation and completion of the survey. The print version was to be returned after it was completed on the spot, while participants who used the electronic link filled either on the spot or later at their own convenience. The participants were explained the objective of the study before completion of the survey, and assurance of their complete confidentiality as per the institution ethical guidelines. Furthermore, to ensure a non-bias sampling in coverage, the sample had a frame that covered the demographic aspects of the survey including: gender, age, place of residents, per capita annual income (in Euro's), educational level, and marital status.

The survey was distributed and responses were collected from September to December of 2016. On average, the participants spend around 20–30 min to complete the survey. Participants were approached in high traffic areas, such as popular streets, buildings, events, gatherings etc. Some of the participants were approached in their own households to get the older age range and countryside array involved. The participants were contacted in a non-systematic way, a total of 1069 participants contributed, of which, 248 surveys were dismissed due to incomplete survey or participants selected more than one option per question. Thus, 821 surveys were included in this research.

2.4. Data analysis

For the data analysis, the software package of SPSS version 20.0 by IBM Corporation was used to statistically analyze all the data collected. There were twenty-six questions; each question answered correctly would award the participant one point and zero for incorrect answers, percentages of correct and incorrect answers for each question was calculated. Additionally, each subsection of the knowledge portion of the survey the participant could receive between four to six points depending on the subsection. The entire knowledge section of the survey as well as each subsection had their mean score and standard deviation analyzed. After calculating correct and incorrect answers for each participant, the participants that answered more than half of the questions on the survey

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