



# Self-reported food safety knowledge and behaviour among Home and Consumer Studies students



Marie Lange<sup>\*</sup>, Helen Göransson, Ingela Marklinder

Department of Food, Nutrition and Dietetics, Uppsala University, P.O. Box 560, SE 751 22, Uppsala, Sweden

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## ABSTRACT

Home and Consumer Studies (HCS) should be a suitable place for food safety education as it includes plenty of practical cooking and is compulsory for all students in the Swedish school system. A study among HCS teachers however reveals shortcomings in food safety teaching. A survey regarding food safety knowledge and behaviour among HCS students in school Year 9 was performed at different schools with a new system to collect questionnaire data. A Student Response System was used at the participating schools. The students were to answer the questions by using a small handheld wireless control, a clicker, in the response program *Turning Point 2008*. The questionnaire included a total of 26 questions and all questions were shown at PowerPoint slides and read out loud to the students. Some trivial questions were asked at the beginning to ensure the method. A total of 529 students from 18 different schools in different parts of Sweden participated in the survey conducted between September 2013 and January 2014. The survey results were evaluated and analysed using SPSS by performing cross-tabulation and chi-square tests. This study reveals that the students' self-reported food safety knowledge and behaviour are inadequate. Important risk areas need to be highlighted in HCS teaching. Boys reported to be significantly more at risk in terms of food safety regarding the handling of risk foods, reheating and cleaning. Especially for boys who reported seldom cook at home HCS would be extra valuable. This study also indicates the importance of reflection in relation to the hygiene routines which are common in the HCS context. The outcome of this study is that students might leave school without even basic food safety knowledge.

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## 1. Introduction

### 1.1. Background

Several studies have indicated that consumers have inadequate food safety knowledge and behaviour, which has been summarised in a number of publications (Jevšnik, Hoyer, & Raspor, 2008b; Lange, Göransson, & Marklinder, 2014; Raspor, 2008; Redmond & Griffith, 2003; Taché & Carpentier, 2014). Lack of knowledge can be a barrier which prevents consumers from changing risk behaviours (Angelillo, Foresta, Scozzafava, & Pavia, 2001). Knowledge does not automatically lead to safe behaviour, but it enables the consumer to reflect upon their food handling practices (Nielsen-Bohman, 2004). Even if knowledge is an important factor for

predicting food safety behaviour, there are, of course, other important influence factors, such as risk perception, subjective norms and attitude (Mullan, Wong, & Kothe, 2013). Suffering from foodborne illness can lead to acute diseases, but, above all, serious secondary diseases and, in the worst case, even death (Lindqvist, Andersson, Lindbäck, & Wegschider, 2001; WHO, 2000). In addition to these serious health issues, foodborne diseases are an economic burden on society. In Sweden, it has been estimated that approximately 500 000 cases of foodborne infections occur each year. Based on the Swedish population, it means that about 5% have foodborne infections annually (Lindqvist et al., 2001; Norling, 1994; Toljander & Karnehed, 2010). The AgriFood Economics Centre estimates that the annual economic cost of illness caused by the five most common foodborne diseases in Sweden (campylobacteriosis, salmonellosis, yersiniosis, shigellosis and Enterohaemorrhagic *E. Coli* (EHEC)) exceeds SEK 1 billion ( $\approx$ €100 000 000) each year. The most expensive as well as the most common infection is campylobacteriosis. However, calculated per illness, EHEC infection

<sup>\*</sup> Corresponding author.

E-mail addresses: [marie.lange@ikv.uu.se](mailto:marie.lange@ikv.uu.se) (M. Lange), [helen.goransson@ikv.uu.se](mailto:helen.goransson@ikv.uu.se) (H. Göransson), [ingela.marklinder@ikv.uu.se](mailto:ingela.marklinder@ikv.uu.se) (I. Marklinder).

is the most expensive; one EHEC infection costs Swedish society more than twice as much as a case of any of the other diseases (Agrifood Economics Centre, 2015). The global number of foodborne incidents and outbreaks is considered likely to increase in the future (EFSA, 2015; National Food Agency Sweden, 2012; Noerrung, Collins, Budka, & Hugas, 2012; Redmond & Griffith, 2003; WHO, 2000). Food safety understanding is a broad concept and will in this study be defined as food handling, comprising the British Food Standards Agency–inspired four Cs: Cooking, Cleaning, Chilling and Cross-contamination (avoiding it) (FSA, 2014). These four Cs represent areas closely linked to an increased risk of foodborne infection and were considered a suitable basis for this project.

## 1.2. Food safety education

Education is an important step towards food safety knowledge (Jevšnik, Hlebec, & Raspor, 2008a; Mullan et al., 2013; Sumeet, Cates, & Morales, 2005; Taché & Carpentier, 2014). Young people are often involved in some kind of food preparation even from an early age, why childhood can be seen as a crucial time for this knowledge to be developed (Byrd-Bredbenner, Abbot, & Quick, 2010; Haapala & Probart, 2004; Jevšnik et al., 2008a; Ovca, Jevšnik, & Raspor, 2014). Girls seem to more often report that they cook at home (Statistics Sweden, 2014) as well as have better food safety knowledge (Ovca et al., 2014). In Sweden, the school subject Home and Consumer Studies<sup>1</sup> (HCS) would be a suitable place for food safety knowledge as it is compulsory for all students and includes practical cooking. In 2011, the Swedish National Agency for Education highlighted the relevance of food safety knowledge to the health perspective (Swedish National Agency for Education, 2011b).

Students should during the entire compulsory school continually develop knowledge in hygiene and cleaning during the handling, preparation and storage of food. Studies show that foodborne infections are increasing in our society, and this knowledge is therefore of importance from a health perspective

(Swedish National Agency for Education, 2011b p.13 Our translation).

Policy documents for Swedish schools only say *What* the teaching should include and nothing about *How* and seldom anything about *Why* (Emsheimer, Hansson, & Koppfeldt, 2005). In education research, it is, however, of importance to focus on *What* as well as on *How* and *Why* different teaching content is offered to the students (Svedner & Säfström, 2000; Uljens, 1997). In the Swedish compulsory school, HCS is a multidisciplinary subject combining theory with practice and includes plenty of practical cooking with different food items (Lindblom, Arreman, & Hörnell, 2013). Chicken and minced meat has been identified as basic food items in HCS cuisine (Höjjer, 2013). They are also considered as risk foods as their consumption has been linked to outbreaks caused by *Campylobacter* (chicken) and EHEC (minced meat), two of the five most common pathogen causing foodborne diseases in Sweden (Agrifood Economics Centre, 2015). They are dangerous too as they could cause complications and, further, have low infectious doses. A small quantity of raw minced meat could contain enough bacteria to cause infection. If eaten, it could lead to infection and serious complications, especially for young people and the elderly (National Food Agency Sweden, 2007).

The consumer has a vital role in trying to reduce the number of foodborne infections as faulty food handling processes may increase the risk (Meysenburg, Albrecht, Litchfield, & Ritter-Gooder, 2014). Nevertheless, the consumer often underestimates the risk of getting a foodborne infection by poor food handling in the home (Azevedo, Albano, Silva, & Teixeira, 2014; Byrd-Bredbenner, Berning, Martin-Biggers, & Quick, 2013; Nesbitt et al., 2014). However, the European Union Summary Report (EFSA, 2015) indicates that approximately one in every three cases of foodborne illness occurs at home; hence, HCS instruction, from a food safety perspective, is of research interest. Both the WHO and the EU have highlighted the importance of food safety education. In this perspective, HCS teaching has the potential to educate safe future consumers as all the HCS lessons are compulsory and would thereby reach all students. In a study of HCS teachers (Lange et al., 2014), a majority reported that they had a positive attitude towards food safety education and stated its importance given that it is linked to maintaining health. The findings, however, show inadequate teaching of the four Cs of food safety. Risk areas related to the handling of raw minced meat (*Cooking*), cold food storage (*Chilling*) and steps to avoid *Cross-contamination* risk being neglected by the teaching. *Cleaning* practices (handwashing, washing up dishes, using dishcloths, cleaning work surfaces) were included in the teaching of routines (Lange et al., 2014). Based on this, it is of research interest to investigate what final-year HCS students know about the four Cs of food safety. Few studies have been done on food safety in relation to adolescence and education, although none in Sweden. The aim of this study was to investigate self-reported food safety knowledge and behaviour among Year 9 HCS students.

## 2. Method

### 2.1. Material

The participants were Year 9 compulsory school students, aged 15 to 16, a point at which they had received the majority of their HCS instruction. Using a convenience selection, we contacted schools from different parts of Sweden in order to create an understanding of food safety in HCS instruction. The participating schools were in central, northern and southern Sweden. To get an accurate result, the visited schools were in different socio-economic areas as well as in cities, smaller towns and rural areas. Of the 46 schools contacted, 18 agreed to participate in the survey with a total of 533 students. Two students chose not to participate, and two withdrew their participation during the response session. A final total of 529 students responded to the survey, carried out between September 2013 and January 2014.

### 2.2. Response collection using SRS

We employed a Student Response System (SRS)<sup>2</sup> in which the students' responses were collected at their schools using the response program Turning Point 2008. Questions were inserted into PowerPoint lecture slides displayed on a projection screen. When a PowerPoint slide with a question appeared, the instructor read it out loud and could answer questions if necessary. Then the students answered using a small wireless handheld device: a clicker. Each response option had a corresponding letter, and the students used their clicker to select a multiple-choice answer. After each question, the students could see the distribution of the responses. In Turning Point 2008, it is possible to see the total number

<sup>1</sup> HCS is the Swedish terminology for what is referred to internationally as Home Economics.

<sup>2</sup> A number of names are used to describe clickers, but in this study they will be referred to as a Student Response System (SRS).

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