



Food safety awareness, knowledge and practices among students in Slovenia



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ABSTRACT

It is critical for children to understand food-related risks to preserve their health and the health of others, particularly because their food preparation responsibilities will increase in adulthood. The purpose of this study ($n = 1272$) was to explore the inclusion of 10- to 12-year-old students in food preparation activities and to determine their understanding of food-related risks, food safety knowledge and self-reported practices in their domestic environment prior to systematic involvement in these activities during regular schooling. This study highlighted their inclusion in food preparation activities with limited experiences. For food-related risks, a high level of perceived severity and a low level of perceived vulnerability were observed. Particular lack of knowledge was identified regarding the impact of temperature on microorganisms. Additionally, self-reported practices indicated risky behaviours for the prevention of cross-contamination, preservation of leftovers, re-heating of food in a potentially unsafe manner and food preparation activities with unprotected wounds on their hands. These results demonstrate that the systematic teaching of basic food safety principles as early as primary school remains necessary.

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1. Introduction

A study of children regarding food safety awareness, knowledge and practices is addressed on two levels: food preparation at their current stage of development and food preparation responsibilities in the future. Understanding food-related risks is critical for the preservation of the food preparers' own health and the health of others. Children, in addition to the elderly, pregnant women and immune-compromised persons, are the most vulnerable category to foodborne illness, and as adults, they will continue to practice food-related behaviours at home as caregivers for family members or as employees in the food business sector. After habits are established, they tend to be long lasting and difficult to alter at later life stages (Wills, Backett-Milburn, Gregory, & Lawton, 2005).

European Food Safety Authority [EFSA] reports 5648 (1.1/100,000) food-borne outbreaks affecting 69,553 people, with the household/domestic kitchen as the second most commonly (32.7%) reported setting for outbreaks (EFSA, 2013), indicating the weakness

of consumers as a last link in the food supply chain. However, these numbers do not reflect the actual epidemiology because in the official reports, only the reported outbreaks are recorded. Therefore, the importance of unreported cases should not be ignored because people with mild clinical symptoms often do not seek medical assistance and are therefore not counted in the official reports.

Although childhood is a crucial time for developing food safety knowledge and skills (Mullan, Wong, & Kothe, 2013), more studies are devoted to adult consumers than children and their food-handling practises. There is evidence that children either collaborate with their parents to prepare food (Byrd-Bredbenner, Abbot, & Quick, 2010) or prepare food at home by themselves (Haapala & Probart, 2004). A previous study of Slovenian adults reports that respondents learnt their cooking practices primarily from their parents (Jevšnik, Hlebec, & Raspor, 2008). Furthermore, studies of children, adolescents and young adults report that parents are a primary source of information or the first introduction to food safety concepts (Byrd-Bredbenner et al., 2010; Coulson, 2002; Eves et al., 2006). According to the theory of planned behaviour (Ajzen, 1991), an individual is more likely to perform a specific behaviour if he or she believes that parents (as important others) also think this behaviour is essential. This presents a risk that deficiencies in food handling may be passed on to children, and previous studies

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identified these deficiencies as a lack of responsibility, lack of knowledge and bad practices. Although Caraher, Baker, and Burns (2004) considered mothers to be the primary person to pass on cooking skills, they also report that as the child matures, parental power may be reduced by influence from teachers, peers and celebrity chefs. Whereas malpractice is often related to health damage or the risk of death, risk perception is a factor that influences motivation and is an important aspect when investigating food safety knowledge and practices (Mullan et al., 2013). Furthermore, self-efficacy in safe food handling by children, as demonstrated by their confidence to perform a specific behaviour, was also evaluated (Haapala & Probart, 2004; Mullan et al., 2013).

Research of children and adolescents primarily focuses on defining baseline data to serve as a starting point for educational interventions (Byrd-Bredbenner et al., 2010; Haapala & Probart, 2004), the evaluation of educational interventions (Faccio et al., 2013) and social marketing campaigns (Byrd-Bredbenner et al., 2007). However, the systematic delivery of these contents to all children during regular schooling should not be neglected. As reported by others (Byrd-Bredbenner et al., 2007; Griffith & Redmond, 2001; Mullan et al., 2013), because of changes in the educational system, food safety information has been restricted in national curriculums, which indicates that food safety issues are not high-priority topics in schools.

Previous studies of the general Slovenian population and its sub-groups revealed misunderstanding of responsibility towards food safety and gaps in knowledge and practices (Jevšnik, Hlebec, et al., 2008; Jevšnik, Hoyer, & Raspor, 2008; Jevšnik et al., 2013), prompting continued research with children. The purpose of this study was to gain insight into the experiences of children with food, their understanding of food-related risks, food safety knowledge and self-reported practices in the domestic environment prior to systematic involvement in these activities during regular schooling. The results of this study will provide a starting point for the later evaluation of existing regular schooling contributions to overall food safety.

2. Material and methods

2.1. Design

This study was conducted at the beginning of school year (2012/13). The participants were recruited by an e-mail invitation sent to 52 primary schools in the municipality of Ljubljana, capital of Slovenia, and its surroundings, addressed to home economics teachers. Half the schools (26) responded to the invitation, representing 5.8% of all primary schools in Slovenia (450). After official permission by the school principal for the proposed study was granted, the home economics teacher collected the parental permission. All respondents were anonymised and participated voluntarily. The National Medical Ethics Committee approved the study design.

The questionnaires and survey instructions were sent by post to the home economics teachers. The teachers were expected to be present when the respondents were answering the questionnaire and were instructed with written guidelines to explain the questions/content when necessary. The teachers were also instructed to emphasise to the respondents the importance of honesty in the responses, particularly when reporting their practices. The goal of these instructions was to prevent respondents from reporting 'always' to practices they recognised as necessary, but do not always perform. After the questionnaires were answered, home economics teachers sent them back by post. As a reward for participation in the survey, a special workshop related to cleaning, cross-contamination, heat treatment, temperature control and hand hygiene mistakes,

with the necessary measures to prevent foodborne illness at home, was offered. The workshop was held approximately two weeks after the survey. The students were involved in the workshop and their teachers were present as observers.

2.2. Questionnaire

The questionnaire was developed by authors considering preventive measures identified by the World Health Organization (2012) as crucial for food safety (keep clean, separate raw and cooked, cook thoroughly, keep food at safe temperatures, use safe water and raw materials), and previous studies (Byrd-Bredbenner et al., 2010; Haapala & Probart, 2004). The questionnaire was divided into four sections. The 1st section was composed of five questions and ascertained the experiences of the children with food. The 2nd section evaluated their personal understanding of food-related risk and was assessed with six statements. Food safety knowledge was tested in the 3rd section using 18 true-and-false questions divided into six categories, including cleanliness of kitchen surfaces and kitchen utensils, prevention of cross-contamination, heat treatment, temperature control, checking food before use/eating, hand hygiene and one uncategorised question related to food safety responsibility after purchase. Self-reported food safety practices were investigated in the 4th section, composed of the 15 previously described actions. Using a 5-point scale (never, almost never, sometimes, almost always, always) the respondents reported how often they performed the described action. There was an additional option for those not involved in the described situation. The questionnaire was tested by 42 students (two classes in one primary school not included in dataset) to determine the question clarity, identify additional response options, and gauge the length of time necessary to answer the survey. The questionnaire was revised on the basis of the pre-test.

2.3. Data analysis

The results were evaluated and analysed using the SPSS 20.0 software package. To examine the relationships among and between the variables, cross tabulations and the χ^2 test, Pearson correlation coefficient and an independent sample *t*-test were used according to the question type. In addition to gender and place of living, self-reported prior knowledge about the prevention of food poisoning was also used as an independent variable. The respondents who did not prepare food, help their parents during food preparation, or selected the option 'other', were not included in the analysis of self-reported food safety practices when appropriate (self-reported practices including food preparation operations).

3. Results

A total of 1272 respondents participated in the study of which 50.9% were boys and 49.1% were girls. The respondents lived in the city (72.7%) or in the suburb (27.3%) and were between 10 and 12 years of age with majority (93.8%) being 11 years old.

3.1. Experiences with food

The majority of respondents are already included in food preparation operations at home, and 84.2% report that they enjoy preparing food, with girls responding more favourably than boys ($p = .000$). Consequently, participation (Table 1) was also gender related, with girls more frequently involved in these activities ($p = .000$). However, when asked to list the three most frequent food items they prepare, the respondents answered primarily snacks and simple dishes, which are not classified as potentially

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