



## Food hygiene knowledge and practice of consumers in Poland and in Thailand - A survey



Marzena Tomaszewska<sup>a</sup>, Joanna Trafialek<sup>a</sup>, Pornsiri Suebpongsang<sup>b</sup>,  
Wojciech Kolanowski<sup>c,\*</sup>

<sup>a</sup> Warsaw University of Life Sciences, Faculty of Human Nutrition and Consumer Sciences, Nowoursynowska str. 166, PL-02-787 Warsaw, Poland

<sup>b</sup> Chiang Mai University, Faculty of Agriculture, 239 Huay Keaw Road, Chiang Mai 50200, Thailand

<sup>c</sup> Siedlce University of Natural Sciences and Humanities, Faculty of Natural Sciences, Department of Dietetics and Food Assessment, Prusa str. 14, PL-08-110 Siedlce, Poland

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### ABSTRACT

The aim of this study was to assess and compare the knowledge of Polish and Thai consumers regarding the causes of food poisoning and hygienic practices during the preparation of food at home. A questionnaire was prepared on the basis of Codex Alimentarius guidelines. It consisted of 15 questions related to consumers' knowledge of food poisoning causes, and 20 questions related to the consumers' food hygiene practice during the preparation of meals at home. Six hundred questionnaires were collected, 300 in Poland and 300 in Thailand. The results were subjected to statistical analysis. In Thailand, consumers showed significantly lower levels of food hygiene knowledge than in Poland. However, both Polish and Thai consumers had incomplete knowledge of the causes of food poisoning and, in many cases, their food hygiene practice during food preparation and consumption was inaccurate. None of the consumers responded correctly to all the questions concerning food hygiene knowledge. In the case of food hygiene practice, nearly total correct responses were noted only in the cases of washing hands after using the toilet, and the risk of drinking raw water from open air lakes and reservoirs. Some other elements of food hygiene practice were incorrectly stated in both countries, e.g. food defrosting, storage of cooked food at room temperature, and hand washing after handling raw, unwashed foods. Further research on consumers' food hygiene knowledge and practice should be conducted, and better food safety education should be organised independently of country of origin, education level and age. The results of this study could play an important role in the prevention of food poisoning by indicating which areas of consumers' food hygiene knowledge and food hygiene practice during food preparation at home should be strengthened by educational activities.

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### 1. Introduction

Food poisoning is usually caused by bacteria, viruses, parasites and chemicals entering the human body through the consumption of contaminated food and water. Food poisoning can lead to long-term disability and even death. The most common symptom of food poisoning is diarrhoea, which annually affects ca. 550 million people worldwide and causes ca. 230,000 deaths per annum (WHO, 2015). Examples of high risk food include undercooked food of animal origin, fruit and vegetables contaminated with faeces, or

toxins from raw molluscs.

Food-related health problems occur both in developing and developed countries. The European Food Safety Authority indicated that, in 2015 in the EU, 45,875 cases of food poisoning were reported, which caused 3892 hospitalisations and 17 deaths (EFSA, 2016). France, followed by Poland, Germany and Lithuania reported the highest number of cases (around 60% of all reported cases). Food poisoning is even more of a problem in tropical countries, such as in Thailand, where annually 120,000 cases were reported (FAO/WHO, 2004; Minami et al., 2010).

Food poisoning is a serious public health problem. Martins, Hogg, and Otero (2012) pointed out that the total costs associated with food poisoning in the USA amounted to almost \$152 billion annually. This includes medical care costs, lower quality of life

\* Corresponding author.

E-mail address: [wojciech.kolanowski@uph.edu.pl](mailto:wojciech.kolanowski@uph.edu.pl) (W. Kolanowski).

(including reduced labour productivity) and reduced life expectancy.

A significant percentage of all food poisoning cases takes place in single households (EFSA, 2016). However, more research has focused on the knowledge and behaviour of employees involved in food production than on those who prepare meals at home (Abdul-Mutalib et al., 2012; Akabanda, Hlortsi, & Owusu-Kwarteng, 2017; Al-Shabib, Mosilhey, & Husain, 2016; Burke, Young, & Papadopoulos, 2016; Campos et al., 2009; Hassan & Dimassi, 2014; Martins et al., 2012; Sharif, Obaidat, & Al-Dalalah, 2013). Salmonella contamination is a great food safety problem, especially with regard to food products of animal origin. Therefore consumers should avoid consumption of raw or undercooked products such as meat or eggs. Cardinale, Perrier Gros, Tall, Guèye, and Salvat (2005) found that the risk of salmonella infection increased when fresh vegetables were not washed and peeled during meal preparation. Many studies concerning food handling by consumers at home, ad these often reveal non-compliance with food hygiene principles during meal preparation were published (Badrie, Gobin, Dookeran, & Duncan, 2006; Langiano et al., 2012). Nevertheless, the authors have been unable to find any literature comparing knowledge of the causes of food poisoning and good household food processing practice among consumers from the EU and Asian countries. Therefore, it was decided to contribute to the body of knowledge in this area.

Poland and Thailand are often visited by foreign tourists. In particular, Thailand is a very popular tourist destination for visitors from all over the world, and one of its attractions is local food (Chavarria & Phakdee-auksorn, 2017; Poolklai, 2015; Sirigunna, 2015). Nevertheless, it is generally agreed that food is one of the health risk factors associated with international tourism (Lepp & Gibson, 2003). Sirigunna (2015) indicated, that in Thailand there were many cases of food poisoning among tourists caused by consuming either unsafe food or water. It was rare for food poisoning incidents to occur in four and five star hotels and restaurants, or during well organized trips; most often they were the result of the consumption of low-priced street-vended food, prepared with poor attention to adequate food hygiene practice. Nevertheless, some tourists enjoy travelling by themselves, and eating and drinking local – usually street-vended – food and drinks (Wongleedee, 2013).

Reducing the risk of food poisoning depends not only on the maintenance of adequate food hygiene practice by food professionals, but also on the behaviour of consumers when purchasing food, and their attitude to food safety and hygiene during food preparation. Accordingly, the aim of this study was to assess and compare Polish and Thai consumers knowledge of food poisoning causes and food hygiene practice during the preparation of food at home.

## 2. Material and method

The study was conducted using a specially designed questionnaire prepared on the basis of Codex Alimentarius (CA) general principles of food hygiene (CCFH, 2003). The questionnaire consisted of three sections: the first contained 15 statements relating to consumers' knowledge of the causes of food poisoning. The second section contained 20 questions relating to the consumers' food hygiene practice during the preparation and the consumption of meals at home (Table 1).

The third section contained questions concerning the demographic and social affiliation of respondents i.e. gender, age, education level, inhabitancy (place of origin), which characterised those surveyed.

The scoring of questions was based on the Likert scale, with 5

variants of responses. In the food hygiene knowledge section, respondents were asked to determine to what extent they agreed with a particular statement – on a scale ranging from “strongly agree” to “strongly disagree”. In the food hygiene practice section – the scale varied from “definitely yes” to “definitely not”. The responses were scored on a scale from 1 to 5. In the food hygiene knowledge section, a score from 1 – “strongly agree” to 5 – “strongly disagree” was to be assigned to all 15 statements. In the food hygiene practice section, a score ranging from 1 – “definitely yes” to 5 – “definitely not” was to be assigned in the case of questions 1 to 7. For questions 8 to 20 the scale direction was changed, i.e. from 1 – “definitely not” to 5 – “definitely yes”. To verify responses some questions were very similar e.g. questions 13 and 15 in the section of consumers' knowledge and questions 1 and 9 in the section of food hygiene practice. In all questions the highest score, relating to the most correct response, was 1 and the lowest one (the least correct) was 5. The responses were converted into scores from 1 to 5. Scores 1 and 2 were counted as correct responses (1 – correct with great conviction, 2 – correct without conviction). Scores 3 and above were counted as incorrect responses. The questionnaire was verified during a pilot test on small group of consumers in order to eliminate mistakes and inaccuracies.

The consumers who participated in the study were randomly selected. Questionnaires were distributed among persons encountered in facilities open to the public such as universities, shopping centres and chain restaurants. Questionnaires were collected by the first and second author of this paper in Poland, and by the second and third author of this paper in Thailand. The interviewers were trained about the methodological assumptions of the study. During the completion of the questionnaire, the interviewers were present to resolve any doubts that consumers might have. The survey was anonymous. The completed questionnaires were put into a box. Identity numbers were assigned to each questionnaire. The study was conducted in Poland and Thailand in the years 2016 and 2017. Six hundred questionnaires were collected, 300 in Poland and 300 in Thailand.

### 2.1. Statistics

The percentage of correct responses was calculated both for the section about hygiene knowledge and for the section about food hygiene practice. Descriptive statistics such as mean scores, median, mode, kurtosis, and standard deviation (SD) were calculated to interpret the results. To verify the relationship between the results obtained in both countries and to determine the impact of factors such as country, gender, age, level of education, and place of origin on the response scores the ANOVA-test was applied. The Spearman correlation coefficient was calculated in order to determine the relation of the knowledge of Thai consumers and Polish consumers and their food hygiene practice. All tests were done using Statistica 12 software. Significance was identified when  $p < 0.05$ .

## 3. Results

The demographic characteristics of consumers' groups is given in Table 2.

### 3.1. Consumers' knowledge of food poisoning causes

The knowledge of those surveyed regarding sources of food poisoning was imperfect. Polish consumers provided significantly better responses than Thai consumers to 7 questions. Thai consumers showed better hygiene knowledge in the case of 3 questions. Responses to 5 questions showed no significant

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