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Perception of food safety risk among the residents of the city of Tuzla

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netically modified organisms (GMOs) in food. For 49.3% of respondents, the main source of information about food-related risks was the internet (excluding social media). The awareness level index was very high for food safety-related topics among 51.7% of respondents, while it was very low for 1.4%. The findings highlight the need to improve food safety perception through a multidisciplinary approach that includes education, strengthening trust in institutions, and effective risk communication. It would be desirable to compare the attitudes of people in rural and urban areas, as well as the general population of Bosnia and Herzegovina.

Keywords: food safety; risk; risk perception; population.**Abstract**

A significant factor in food safety is the consumer, particularly their perception. This study aimed to determine consumer perception of food safety in the area of the city of Tuzla, Tuzlanski Canton, Bosnia and Herzegovina. The study was conducted in 2022 using a questionnaire specifically designed for this purpose and administered to a sample of 211 respondents. Statistical data analysis was performed using SPSS software, version 25. Comparative descriptive analysis was used. For 43.8% of respondents, food safety is a priority when purchasing food. 52.1% of respondents stated that the most common area of concern is food safety, and 31.3% identified the topic of ge-

INTRODUCTION

Food safety refers to ensuring that food, at all stages of production and distribution, does not pose a risk to human health. Food safety refers to the routines in preparing, handling, and storing food with the goal of preventing foodborne illnesses. Food safety is a systematic approach to responsibility that concerns all aspects of the global food industry.

The public's perception of food safety is an important segment of public health and influences consumer behavior, trust in institutions, and dietary choices. Although developed food control systems exist, public perception often does not align with the actual level of safety [1]. Perception of food safety directly influences consumer habits, adherence to hygiene measures, and trust in the food control system [2]. An inadequate perception of food safety may lead either to unnecessary public concern or to the neglect of actual health risks [3]. Risk communication in the area of food safety is used to facilitate understanding and dialogue among

all stakeholders on food safety issues, including consumers [4].

Food safety perception is influenced by the media, personal experiences, education level, trust in authorities, and socioeconomic status. Information about food incidents often has a long-lasting negative effect on consumer trust [5]. Extensive studies have been conducted to link the source of food-related risks with consumer risk perception. However, it appears that consumer risk perception of food safety does not depend so much on the hazard itself as on the social and psychological characteristics associated with food hazards.

Research has shown that a large part of the public's reaction to risk can be attributed to sensitivity, and not just the technical, but also the social and psychological properties of the hazard. Many empirical studies of consumer perception of food safety have focused on perceived risk associated with food, food hazards, and food technologies. It is increasingly clear that consumers make decisions about the acceptability of certain

foods and production technologies based on the complex interaction of risk and benefit perceptions associated with a particular food choice.

Research has shown that women and middle-aged respondents are significantly more cautious when shopping for food and more concerned about food safety issues than men and younger people. There is a significant link between gender and the consumption of high-risk foods, with men consuming more of such foods than women. Furthermore, high-risk foods are more frequently consumed by younger than older people, with highly educated consumers making more conscious purchases[6]. Young people engage in risky food behaviors such as consuming raw or undercooked animal-based foods, which puts them at increased risk of foodborne illnesses [7].

Women and better-educated consumers more often use food safety information [8]. It can be said that risk perception is a psychological category rather than just an actual risk, since it is influenced by experience, culture, gender, age, and trust in institutions, while it affects food purchasing and consumer behavior. A regional study (Kosovo) on consumer attitudes shows that highly educated female consumers are more concerned about personal health risks related to food safety [9].

Research on how online information and risk perception influence food risk prevention behavior shows that obtaining food safety information online does not affect the behavior of users who are less concerned about this issue in terms of food risk prevention [10].

In the Netherlands, two studies in 2005 and 2009 compared risk perceptions between consumers and experts and tracked changes over time, showing how attitudes aligned on a particular topic [11].

Improving public knowledge and transparent risk communication are key to aligning perception with the actual level of food safety. In their 2004 paper, authors Redmond and colleagues identified the phenomenon of optimistic bias among consumers, whereby most believe that others are more exposed to risk than they are themselves. The study shows that such beliefs can reduce the effectiveness of educational campaigns [12].

Tucker’s work showed that the media can increase consumer risk perception, which in turn can lead to a better understanding of consumer behavior itself [13]. This paper aims to determine consumer perception of food safety in the area of the city of Tuzla, Tuzla Canton, Bosnia and Herzegovina.

METHODS

To assess population perception, a food safety questionnaire was developed and administered via the Google Forms platform between January and July 2022. The survey link was promoted through the website and Facebook page of the Institute of Public Health of Tuzla Canton.

The questionnaire consisted of 12 questions, of which four were related to demographic characteristics, while eight addressed food purchasing priorities, levels of concern, risk perception, topics that most frequently cause concern, main sources of information on food-related risks, trust in information sources, and awareness of the food safety system. Awareness of the food safety system was assessed using an awareness level index based on familiarity with food safety topics: very high (awareness of 8 out of 15 topics), high (6–7 topics), medium (4–5 topics), low (2–3 topics), and very low (one or none of the 15 topics).

RESULTS

The age distribution was as follows: 10.4% (21) aged 15–24 years, 46.9% (99) aged 25–39 years, 25.6% (80) aged 40–54 years, and 17.1% (11) aged over 55 years (Table 1). The survey was completed by 211 respondents, of whom 53.1% (112) were women and 46.9% (99) were men (Table 2).

Regarding educational level, 49.0% (103) of respondents held a university degree, 47.4% (100) had completed secondary education, 2.4% (5) held a master’s or doctoral degree, and 0.9% (3) had completed primary education. Food purchasing priorities were assessed based on responses related to food safety, price, nutritional content, taste, and food origin. Of the total number of respondents, 43.8% (92) reported food

Table 1. Distribution by gender and age.

Gender	Age (year)				Total	p
	15 – 24	25 – 39	40 – 54	> 55		
Male	10	46	38	5	99	0,05
Female	11	53	42	6	112	
Total	21	99	80	11	211	

Table 2. Results of the analysis of gender differences in risk awareness and perception.

The difference in food safety between men and women	N	SD	P
Male	99	1,03982	0,268
Female	112	1,12249	

safety as the most important factor, followed by price (21.0%; 44), nutritional content (12.4%; 26), and taste and origin (6.2%; 13)

Food safety was identified as the main concern when choosing food by 52.1% (110) of respondents, whereas 20.0% (42) reported no concern, believing that the food available on the market is safe. Genetically modified organisms (GMOs) were identified as the topic of greatest concern by 31.0% (66) of respondents. The internet (excluding social media) was reported as the main source of information on food-related risks by 49.3% (104) of respondents. The level of awareness of food safety topics was very high among 51.7% of respondents, while a very low level of awareness was reported by 1.4%.

Regarding trust in information sources, 50.0% of respondents expressed trust in scientists, while distrust was reported towards supermarkets (58.8%), bloggers and influencers (45.5%), and authorities (46.5%).

DISCUSSION

Food is fundamental to life, highlighting the need to understand what we consume and the principles that define food safety. The most important factors influencing people’s opinions about food are education level, the media, social networks, as well as personal experience (poisoning, diseases from inadequate nutrition), trust in institutions, and more. A 2022 study, one of the few to include respondents from 9 countries, described consumer risk perception in an international context and showed that food hygiene and its origin are most often recognized by consumers as the most important factor related to food safety risk, and that trust in government authorities is important [14].

In European research, GMOs provoke a fear of risk, but consumers also do not see the benefits of such food [15]. Our results showed that one-third of respondents consider GMOs harmful to health, while this is the view of as many as 76% of respondents in a survey conducted in Montenegro [16,17]. A 2019 study of a sample of 27,655 participants from 28 EU member states showed that 40% of respondents were concerned about food safety, and 55% had a high level of food safety awareness. There were significant differences in

risk perception among countries, but 43% of respondents believed that food products are full of harmful substances. Greater awareness (72% of respondents) was observed regarding food additives, such as colors, preservatives, and flavors. However, the main concern was the residues of antibiotics, hormones, or steroids in meat (mentioned by 44% of respondents), followed by pesticide residues (39%) [18]. Research in Croatia on this topic showed similar results [19].

The food safety knowledge score among students in Serbia was 59.7%, indicating a moderate level of knowledge, in contrast to our results, which showed a high level of knowledge [20]. According to Eurobarometer 2025, about 79% of European citizens believe that systems exist to ensure food safety [21].

The results of Verbeke’s work warn that the way information is presented affects perception. The study emphasizes the importance of accurate information [22]. People react differently to the same piece of data depending on the emotional tone, the way the problem is framed, and the source of the information. Emotions often override scientific facts. People are more afraid of the unknown and new technologies and risks they cannot control, so trust in institutions and information sources is crucial [23].

Ratt’s 2000 study emphasizes the importance of clear information; proper communication reduces people’s fear, and this finding can be used to organize educational campaigns about food risks, form correct thinking, and increase trust [24].

The consumer perception of food safety risk depends less on the hazard itself than on the social and psychological characteristics associated with food hazards. Research has shown that a large part of the public’s reaction to a risk can be attributed to its salience, and not just its technical, but also its social and psychological properties. Scientists need to understand the complex relationship between the media and their audience if they want to counter frightening narratives and put risks and benefits into proper context. Although consumers have access to vast amounts of information, they choose to be less than fully informed [23].

CONCLUSION

Numerous biological and chemical factors affect food safety and may consequently have adverse effects on human health. An essential component of food safety is the consumer, particularly their perception and awareness of food safety issues. Continuous efforts are required to strengthen public awareness and improve access to accurate information on food safety. Further research comparing the attitudes of populations from rural and urban areas, as well as the general population of Bosnia and Herzegovina, would be valuable. Moreover, studies of this type may provide important evidence to support decision-making related to food policy development and investments in the food supply sector.

REFERENCES

1. World Health Organization. Food safety. Geneva. WHO; 2022.
2. Siegrist M, Hartmann C. Perceived naturalness, disgust, trust and food neophobia as predictors of cultured meat acceptance in ten countries. *Appetite*. 2020;155:104814.
3. Food and Agriculture Organization of the United Nations. Food safety risk analysis: A guide for national food safety authorities. Rome. FAO; 2006.
4. Food and Agriculture Organization of the United Nations. Risk communication applied to food safety handbook. Rome, Italy. FAO. 2016.
5. Frewer LJ, Fischer ARH, Brennan M, et al. Risk/benefit communication about food – a systematic review of the literature. *Crit Rev Food Sci Nutr*. 2016;56(10):1728-1745.
6. Zorba NN, Kaptan M. Consumer food safety perceptions and practices in a Turkish community. *J Food Prot*. 2011;74(11):1922-9.
7. Byrd-Bredbenner C, Abbot JM, Wheatley V, Schaffner D, Bruhn C, Blalock L. Risky eating behaviors of young adults-implications for food safety education. *J Am Diet Assoc*. 2008; 108(3):549-52.
8. Haas R, Imami D, Miftari I, Ymeri P, Grunert K, Meixner O. Consumer Perception of Food Quality and Safety in Western Balkan Countries: Evidence from Albania and Kosovo. *Foods*. 2021;10(1):160.
9. Miftari I, Imami D, Kaliji SA, et al. Analyzing consumer perceptions about food safety by applying the food-related lifestyle approach. *Ital J Food Saf*. 2024;13(1):11315.
10. BMC Public Health. Online information acquisition affects food risk prevention behaviours: the roles of topic concern, information credibility and risk perception. *BMC Public Health* 2023;23:1899.
11. Van Kleef E, Frewer LJ et al. Perception of food-related risks: Difference between consumers and experts and changes over time. *Food Control*. 2022;141:109142.
12. Redmond EC, Griffith CJ. Consumer perceptions of food safety risk, control and responsibility. *Food Control*. 2004;43(3):309-13.
13. Tucker M, Whaley SR, Sharp J. Consumer perceptions of food-related risks. *International Journal of Food Science & Technology*. 2006;41(2):135-46.
14. Djekic I, Nikolic A, Mujcinovic A, Blazic M, et al. How do consumers perceive food safety risks? – Results from a multi-country survey. *Food Control*. 2022;142:109216.
15. Gaskell G, Allum N, Wagner W, Kronberger N, Torgersen H, Hampel J, Bards J. GM foods and the misperception of risk perception. *Risk Anal*. 2004;24(1):185-94.
16. Velimirović A, Jovović Z, Berjan S, El Bilali H, Allahyari M. S. Public perception of genetically modified organisms (GMOs) in Montenegro: insight for sustainable biotechnology and policy development. *GM Crops & Food* 2026;17(1):2620884.
17. Costa-Font M, Gil J. M., Traill W. B. Consumer acceptance, valuation of and attitudes towards genetically modified food: Review and implications for food policy. *Food Policy*. 2008;33 (2):99-111.
18. European Food Safety Authority (EFSA). Eurobarometer on Food Safety in the EU 2019. Parma: EFSA; 2019.
19. Krajnović A, Gašpić K, Stipanov I. Food safety and consumer perception of food safety in the European Union and the Republic of Croatia. *Journal of economics and politics of transition*. 2018;20:31-55.
20. Vuksanović N, Demirović Bajrami D, Petrović MD, Jotanić Raletić S, Radivojević G. Knowledge About Food Safety and Handling Practices – Lessons from the Serbian Public Universities. *Zdr Varst*. 2022;61(3):145-54.
21. European Food Safety Authority (EFSA) Eurobarometer on Food Safety in the EU 2025. Parma: EFSA; 2025.
22. Verbeke W. Impact of communication on consumers' food choices. *Proc Nutr Soc*. 2008;67(3):281-8.
23. McCluskey J, Swinnen J. The media and food-risk perceptions. *EMBO Rep*. 2011;12(7):624-9.
24. Knox B. Consumer perception and understanding of risk from food. *Br Med Bull*. 2000;56(1):97-109.

Percepcija rizika o sigurnosti hrane stanovnika grada Tuzla

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Kratak sadržaj

Značajan faktor sigurnosti hrane je potrošač, odnosno njegova percepcija. Cilj ovog rada je bio utvrditi percepciju potrošača o sigurnosti hrane na području grada Tuzla, Tuzlanski kanton, Bosna i Hercegovina. Upitnikom kreira-

nim za ovu svrhu provedena je studija u toku 2022 godine na uzorku od 211 ispitanika. Statistička obrada podataka je urađena u programskom paketu SPSS, verzija 25. Korištena je komparativna deskriptivna analiza. Prioriteti pri kupovini hrane kod 43,8% ispitanika odnose se na sigurnost hrane, 52,1% ispitanika se izjasnilo da je najčešća zabrinjavajuća oblast sigurnost hrane, i to 31,3% izjasnilo da je to tema genetski modificirani organizmi (GMO) u hrani. Kod 49,3% ispitanika glavni izvor informacija o rizicima vezanim za hranu je bio internet (ne uključujući društvene mreže). Indeks nivoa svijesti je bio vrlo visok o temama vezanim za sigurnost hrane kod 51,7% ispitanika dok je bio vrlo nizak kod 1,4%. Rezultati istraživanja podstiču unapređenje percepcije multidisciplinarnim pristupom koji uključuje edukaciju, jačanje povjerenja u institucije i efikasnu komunikaciju rizika. Poželjno bi bilo uporediti stavove ljudi ruralnih i urbanih sredina kao i cjelokupnog stanovništva Bosne i Hercegovine.

Ključne reči: sigurnost hrane; rizik; percepcija rizika; stanovništvo.