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Original article

Consumers' trust in food risks information sources, concerns, and awareness of food safety issues, and related behaviours: Insights from a cross-sectional study

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Abstract. *Background and aim:* Growing concerns over food safety have spread worldwide due to rising rates of food poisoning and its associated morbidity. This study focused on assessing consumers' trust in sources of information on food safety and risks, concern about and awareness of food safety issues, and related behaviours. *Methods:* This cross-sectional study involved 1,301 participants and was conducted in Saudi Arabia between August and November 2022. A structured online questionnaire was sent to potential participants aged 16 years and older. The chi-squared test and Fisher's exact test were used to assess gender differences in terms of food safety–related knowledge, concerns, and behaviours. For the analysis, the significance level was set at $p < 0.05$. *Results:* Over half (58.2%) of the study participants reported complete trust in national authorities. Approximately half (50.5%) reported not trusting celebrities, bloggers, or influencers. A greater proportion of males (48.9%) than females (39.6%) believed that food products contained harmful substances ($p < 0.001$). There was no significant difference between genders in terms of food safety concerns ($p = 0.22$). Conversely, there was a significant difference between the genders in terms of behavioural changes in response to communication about food risks ($p < 0.001$), with more females (30.6%) than males (22.8%) reporting that they permanently changed their consumption behaviours (e.g. diet, cooking, or storage practices) because of such information at least once in their lifetimes. Most participants' topmost cause for concern was genetically modified ingredients in food or drinks, followed by additives such as colourings, preservatives, or flavourings. *Conclusions:* This study highlights consumer insights into sources of information on food risks, and reveals gender-based differences in terms of food safety–related knowledge, concerns, and behaviours. This research's findings can help food authorities develop guidelines that meet consumers' demands for safer food and conduct education campaigns to increase consumers' awareness of and interest in food safety.

Key words: food safety, gender, trust, food issues, Saudi Arabia

1. Introduction

The safety of consumed food is one of the major determinants of human health and a globule concern. Many governments make food safety a public health priority to reduce the foodborne illness burden, which ranges from diarrhoea to cancer or death as a result of consuming unsafe food that contains food poisoning from bacteria or parasites – to name a few or other chemical and physical hazards (1, 2) The concept of food safety includes factors such as using proper hygiene when handling food and avoiding cross contamination (3). Ensuring food safety requires careful attention during food harvesting, transportation, processing, storage, and consumer preparation and storage (3, 4). In addition to the difficulty of tracing foodborne

illness to its source due to the incubation period of several hazards, consumers are unaware of the physical, biological, or chemical contaminants that may present in specific food products (5). Therefore, food-related morbidity and mortality can result from a lack of food safety awareness (4), consumers expect to have safe, high-quality foods (6-8).

The concerns about consuming foods containing hazardous substances have increased worldwide (9) due to rising rates of food poisoning and associated morbidity (10). For example, approximately 76 million cases of unsafe food consumption are reported annually in the United States, resulting in approximately 300,000 hospitalizations and 5,000 fatalities (11). In Saudi Arabia, approximately 23,310 food poisoning emergency cases are reported at the Ministry of Health hospitals in 2012 (12). According to Al-Mohaithef's (2021) recent study, food poisoning cases are prevalent in Saudi Arabia, but the number of infections and deaths are not precisely reported (13). These cases can be attributed to all stages of the food supply chain, including food mishandling or unsafe food consumption.

Consequently, prevention and intervention strategies should be implemented at all levels, including food handling and providing access to trustworthy sources of information, because food safety is important at every stage (6,14). Consumers' knowledge of food safety and associated behaviours has been studied worldwide (15-17), including in Saudi Arabia (18, 19). For example, one study examined gender-based differences in Saudi university students' food safety knowledge (18). However, to the best of our knowledge, this is the first comprehensive study that provides useful insight into consumers' trust in various sources of information on food safety, concerns, and behavioural changes in response to communication about possible food-related risks.

2. Materials and methods

2.1 Study design and participants

This cross-sectional study was conducted in different Saudi Arabian provinces to reasonably represent the entire country. Non-probabilistic convenience sampling was used. Participants self-selected whether they wished to complete the questionnaire. An advert for the study was distributed via email and social applications such as WhatsApp and Telegram groups. Accordingly, participants voluntarily filled out the online questionnaire via a distributed link. The study sample consisted of 1,301 participants residents of Saudi Arabian provinces.

2.2 Data collection and study procedures

The survey was conducted from August to November 2022. A structured questionnaire based on a previous survey (20) was used to collect data on consumers' concerns and awareness of food safety issues and related behaviours. The questionnaire was divided into two sections. The first section included 12 questions to characterize the sociodemographic and health characteristics of the study participants, such as age, gender, nationality, and health information. The second section consisted of 10 questions and statements focused on food safety, including the following: To what extent do you trust the following sources for information on food risks (non-governmental organizations, celebrities, bloggers and influencers, specialist and personal experience, journalists, national authorities, governmental organizations, food producers, farmers, and consumer organizations)? They could choose between the following responses: totally trust, tend to trust, tend not to trust, do not trust at all, and don't know. The respondents were asked to complete the sentence, "Information that you heard or read about a food risk…" with one of the following statements to describe their personal experiences: made you permanently change your consumption behaviour, made you change your consumption behaviour for a while, never worried you nor made you change your consumption behaviour, other, none, and don't know. The respondents also answered questions about their interest in food safety by answering yes or no to provided statements, and questions on their concerns about and awareness of food safety issues, such as genetically modified ingredients, additives, and pesticide residues. After conducting questionnaire pretesting, any necessary modifications were identified and resolved by specialists in the field by re-framing/rephrasing some questions to ensure the

clarity and suitability of the wording. The results of this pilot study were not included in the final survey. The questionnaire was then sent to potential participants online using the LimeSurvey application.

2.3 Ethical considerations

This study was approved by the Ethics Committee of King Abdulaziz University, Unit of Biomedical Ethics (Ethics reference number: 284-22). Participation was voluntary. All participants provided informed consent before responding to the questionnaire.

2.4 Statistical methods

The data were expressed as frequencies and percentages.. The Chi-squared test and Fisher's exact test were used to assess the frequency distribution and the relationship between covariates and participants' behaviours, awareness, and perceptions of various aspects of food safety and risks. Gender-based differences were also assessed. All statistical analyses were performed using the statistical software package SPSS, version 23.0. Values of $p < 0.05$ were considered statistically significant.

3. Results

3.1 Sociodemographic characteristics of the study participants

Table 1 shows the participants' sociodemographic characteristics. Approximately 50% of the participants were aged 31- 50 years, one-fourth were aged 15-30 years, and one-fourth were aged > 50 years. Females comprised 60% of the sample. Over 90% of the participants were of Saudi nationality. Approximately two-thirds were from Makkah Province. Most participants were married (66.8). More than half had a bachelor's degree, and 20.1% had a postgraduate degree. Among the participants, 45% were employed, approximately 16% were students, and about 16% were unemployed. One-third had a family income of 11,000–20,000 SAR (2,933–5,333 USD), and about one-quarter had an income of > 20,000 SAR (> 5,333 USD).

Table 1. Study participants' sociodemographic characteristics (n = 1301).

Characteristics	n	%
Age (years)		
15-30	364	28
31-50	651	50
>50	286	22
Gender		
Female	780	60
Male	521	40
Ethnicity		
Non-Saudi	114	8.8
Saudi	1187	91.2
Province		
Al bahah province	3	0.2
Al Jowf province	2	0.2
Al Madinah province	84	6.5
Al Qassim province	13	1
Aseer province	77	5.9
Eastern province	52	4
Ha'il Province	2	0.2
Jazan province	4	0.3
Makkah province	882	67.8
Riyadh province	169	13
Tabuk Province	13	1
Social Status		
Divorced	64	4.9
Married	869	66.8
Single	354	27.2
Widowed	14	1.1
Educational level		
Bachelor degree	698	53.7
Diploma without a high school	73	5.6
High school graduate or certificate of equivalency	266	20.4
Postgraduate degree	262	20.1
Uneducated	2	0.2
Employment status		
Employed/ Self-employed	642	49.3
Retired	168	12.9
Student	217	16.7

Table 1 (*Continued*)

Characteristics	n	%
Unemployed (looking for a job)	65	5
Unpaid/housewife	209	16.1
Family Income Saudi Arabian Riyal (SAR)		
Less than 5,000	203	15.6
5,000-10,999	313	24.1
11,000-20,000	438	33.7
More than 20,000	347	26.7
BMI (kg/m2)		
Underweight (<18.5)	58	4.5
Healthy weight (18.5-24.9)	410	31.5
Overweight or obese (≥ 25)	833	64
Perception of health		
Bad Health	273	21
Good health	1028	79
History of co-morbid		
Diabetes	146	11.2
Kidney disease	11	0.8
Liver disease	9	0.7
Stomach ulcers	29	2.2
Cancers	9	0.7
Anemia	86	6.6
Osteoporosis	55	4.2
Cardiovascular diseases	107	8.2
Others	150	11.5

About two-thirds were obese, and 79% believed that they were in good health.

3.2 Trust in sources of information about food risks

Figure 1 shows the degree of the participants' trust in sources of information about food risks. Approximately half (50.9%) of the study participants reported that they tended to trust non-governmental organizations, and 16.3% reported that they completely trusted them. About half (50.5%) reported that they did not trust celebrities, bloggers, or influencers, and 52.7% reported that they tended to trust specialists and personal experience. More than one-quarter (28.5%) reported completely distrusting journalists, while 41.6% reported that they tended not to trust them. Over half (58.2%) completely trusted national authorities, whereas more than one-third (38.5%) reported that they tended not to trust food producers. Fewer than half (42.2%) tended to trust farmers, and a similar proportion (46.0%) tended to trust consumer organizations.

3.3 Consumer behavioural changes in response to communication

Most participants of both genders (82.2%) believed that food safety information was rarely complicated or highly technical. Figure 2 shows the male and female participants' behaviours in response to information they had heard or read about food risks. A significantly greater proportion of females (30.6%) than males (22.8%) reported that food risk information made them permanently change their consumption behaviours (e.g. diet, cooking, or storage practices) at least once in their lifetimes ($p < 0.001$). A greater proportion of males (48.9%) than females (46.8%) reported that food risk information made them temporarily change their consumption behaviours at least once. Similarly, a greater proportion of males (6.3%) than females (2.6%) reported that food risk information never worried them or made them change their consumption behaviours.

3.4 Association between gender and interest in food safety

Table 2 shows participants' interest in food safety by gender. Overall, there were no significant differences between the genders, except that a greater proportion of males (48.9%) than females (39.6%) believed that food products contained harmful substances ($p < 0.001$). Over half (54%) of the participants reported that they were not personally interested in food safety. Most participants (83.2%) felt insufficiently confident in assessing food safety risks independently and needed help from others. A similar proportion (82.2%) reported that food safety information was rarely highly technical or complicated, and 87.7% stated that such information did not reduce their confidence in the source.

3.5 Association between gender and concerns about and awareness of food safety issues

Table 3 demonstrates the male and female participants' concerns about and awareness of food safety

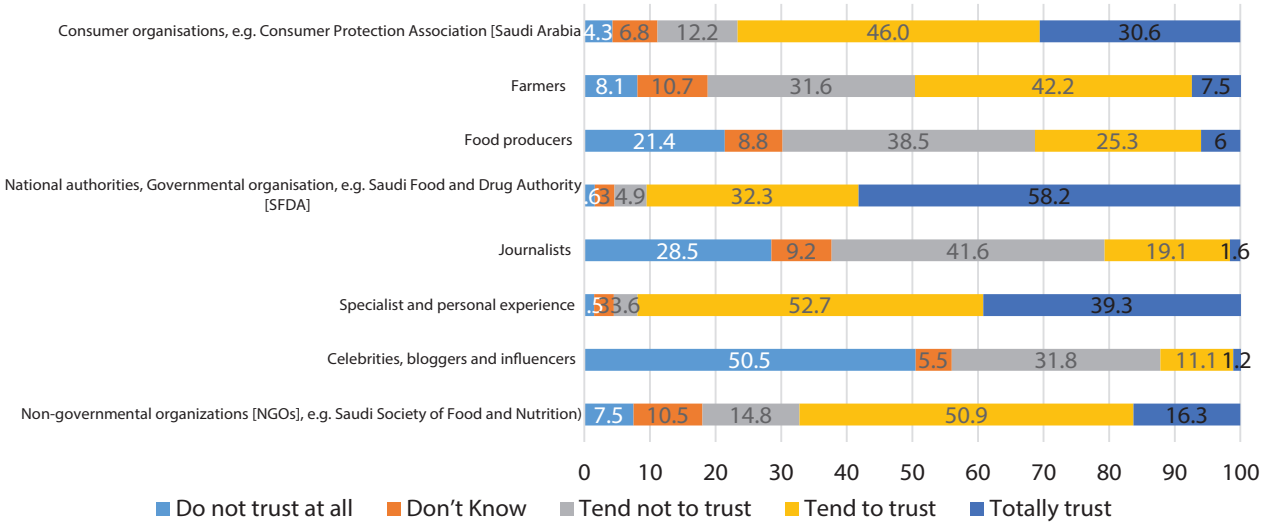

Figure 1. Trust in sources of information on food risks

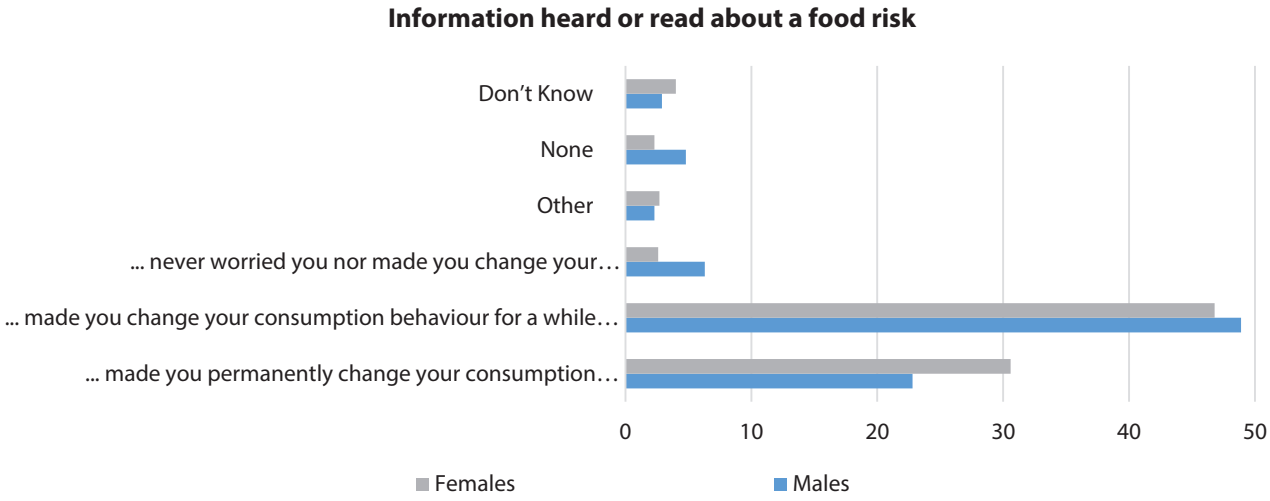

Figure 2. Consumer behavioural changes in response to communication

issues. Overall, there were no significant differences between the genders in terms of food safety concerns (P = 0.22). Approximately 43.2% of the participants considered safety their main concern when choosing food. When assessing the participants'awareness of food safety issues, we found that a significantly greater proportion of females (85.3%) than males (81%) were aware of additives used in food or drinks, such as colourings, preservatives, or flavourings (p = 0.04). Likewise, a significantly greater proportion of females (64.2%) than males (55.9%) had heard of pesticide residues in food (p = 0.002). Similarly, more females (47.3%) than males (39.9%) were aware of allergic reactions to food or drinks (p = 0.009). Conversely, a greater proportion of males (55.1%) than females (47.6%) were aware of bacterial food poisoning (p = 0.008). There were no significant differences between the genders in terms of awareness of other food safety issues.

When participants were asked which food safety issues they had heard about concerned them most, more than one-third of the participants (34.4%) considered genetically modified ingredients in food or

Table 2. Association between gender and interest in food safety (n = 1301).

Particulars	Male		Female		Total		P-value
	n	%	n	%	n	%	
You are personally interested in the topic of food safety							
Yes	251	48.2	348	44.6	599	46	0.21
No	270	51.8	432	55.4	702	54	
You can assess food safety risks for yourself and do not require help from others							
Yes	82	15.7	136	17.4	218	16.8	
No	439	84.3	644	82.6	1083	83.2	0.42
Food safety information is often highly technical and complex							
Yes	103	19.8	128	16.4	231	17.8	0.12
No	418	80.2	652	83.6	1070	82.2	
Nowadays, food products are full of harmful substances							
Yes	255	48.9	309	39.6	726	55.8	<0.001
No	266	51.1	471	60.4	575	44.2	
Highly technical and complex information reduces your confidence in the source							
Yes	75	14.4	85	10.9	160	12.3	0.06
No	446	85.6	695	89.1	1141	87.7	

drinks the greatest cause of concern, followed by additives used in food or drinks (28.4%). Moreover, 12.5% considered bacterial food poisoning an important cause of concern. Surprisingly, only 6.9% considered food hygiene the most important food safety concern.

4. Discussion

This cross-sectional study was conducted in Saudi Arabia to assess consumers' interest in food safety, trust in food safety and risk information sources, perceptions of aspects of food safety, and related behaviours. The study's findings showed that the participants trusted government and national food authorities more than celebrities, bloggers, influencers, farmers, or consumer organizations. Also, found that a large number of participants distrusted journalists. The lack of trust in journalists could be explained by Pintak and Ginges's (2009) findings; they conducted a cross-border survey of 601 Arab journalists and reported a lack of professionalism (21). Moreover, many participants did not trust non-governmental organizations, whereas more than half fully trusted national authorities. This result is consistent with previous studies (22-24) reporting that consumers considered the government one of the most reliable sources of information on food safety. These findings suggest that government organizations and national authorities should expand their interactions with consumers to act as focal points for useful information on food safety and risk.

There was a significant difference between genders regarding consumers' behavioural changes in response to communication about possible food-related risks. More females than males had heard or read about food risks that made them permanently change their consumption behaviours (e.g. diet, cooking, or storage practices). This finding about greater concern among females than males is consistent with a study conducted in Australia that found differences in food safety concerns between genders (25). This difference may be because females are more involved in cooking and storage practices than males. Furthermore, more males than females reported not being concerned about or changing their consumption behaviours; although they had heard or read about food risks, they never worried them. These findings may

Table 3. Association between gender and concerns about and awareness of food safety issues (n = 1301).

Particulars	Male		Female		Overall		P-values
	n	%	n	%	n	%	
How are consumers concerned about food safety?							
Safety is your main concern when choosing food	245	47	317	40.6	562	43.2	0.22
Safety is among your concerns	171	32.8	287	36.8	458	35.2	
Safety does not really concern you, as you take it for granted that the food sold is safe	56	10.7	102	13.1	158	12.1	
Safety does not concern you at all, as you assume that your body can handle food safety risks	21	4	31	4	52	4	
Don't Know	28	5.4	43	5.5	71	5.5	
Which of the following topics you have heard about.							
Genetically modified ingredients in food or drinks	341	65.5	478	61.3	819	63	0.13
Additives like colors, preservatives or flavorings used in food or drinks	422	81	665	85.3	1087	83.6	0.04
Food poisoning from bacteria	287	55	371	47.6	658	50.6	0.008
Pesticide residues in food	291	55.9	501	64.2	792	60.9	0.002
Antibiotic, hormone, or steroid residues in meat	202	38.8	294	37.7	496	38.1	0.69
Environmental pollutants in fish, meat, or dairy	196	37.6	316	40.5	512	39.4	0.29
Traces of materials that come into contact with food, e.g. plastic or aluminum in packaging	273	52.4	435	55.8	708	54.4	0.23
Genome editing in food	116	22.3	167	21.4	283	21.8	0.71
Diseases found in animals	189	36.3	268	34.4	547	35.1	0.47
Plant diseases in crops	154	29.6	206	26.4	360	27.7	0.21
Nanoparticles found in food	42	8.1	74	9.5	116	8.9	0.37
Poisonous molds in food and feed crops	137	26.3	199	25.5	336	25.8	0.75
Food hygiene	305	58.5	462	59.2	767	59	0.8
Allergic reactions to food or drinks	208	39.9	369	47.3	577	44.4	0.009
Microplastics found in food	160	30.7	248	31.8	408	31.4	0.68
None (SPONTANEOUS)	8	1.5	5	0.6	13	1	0.11

be because males typically have lower risk perceptions than females (26,27), which may be attributed to the dominant role of males in families (26,27). However, the reasons for not changing their consumption behaviours require further exploration.

This study also found that many participants were interested in food safety, and most participants did not find food safety information complicated or highly technical. However, a smaller proportion of the study participants were sufficiently confident to assess food safety risks independently, and almost half believed that food products contained harmful substances. While these findings suggest that a reasonable proportion of the Saudi population is interested in food safety, a large number of the study population showed no interest. Thus, the findings highlight the importance of implementing food safety education programmes to increase awareness of and interest in food safety. In terms of gender differences, a greater proportion of female than male participants felt sufficiently confident to assess food safety risks by themselves. This may be due to differences in knowledge and practices between males and females (28). Evidence suggests that females are more knowledgeable about issues related to food

safety, more concerned about food poisoning, and engage in purchasing and handling food more frequently than males (28, 29).

Regarding concerns about and awareness of food safety issues, we found no significant differences between genders in terms of concerns about food safety. This is inconsistent with a study of Al-Shabib et al. (2017) on university students in central Saudi Arabia, which found significant differences between genders (18). Unlike that study, our study involved a significantly larger population from different regions of Saudi Arabia with varied employment characteristics. Overall, almost half of the participants considered safety their main concern when making food choices. For the awareness of food safety issues, we found gender differences. For example, females were more aware of additives used in food or drinks than males were, whereas more males were aware of food poisoning from bacteria. This is consistent with a study of Al-Shabib et al. (2017), more females had heard of pesticide residues in food and allergic reactions to food than males (18). These gender differences may be due to different interests in different aspects of food safety. A study conducted in Ghana also found that the public was concerned about food safety hazards, such as bacterial contamination, excessive artificial colour use, and mould infestations in food (2). However, unlike the current study, the Ghanaian study did not assess differences by gender or knowledge of aspects of food safety; rather, it focused on types of food risks (2). Regarding the cause of concern, most participants in this study considered genetically modified ingredients and additives used in food or drinks their topmost causes of concern. Similar findings were reported from a previously published survey involving a representative sample of 26,691 individuals, commissioned by the European Food Safety Authority (EFSA, 2010), which showed that 66% of respondents were very or fairly worried about genetically modified ingredients in food or drinks, followed by additives (30). These findings suggest that consumers consider such modifications unnatural food production processes, and these data can strengthen the compatibility between legislation and consumers' acceptance of food modifications.

To our knowledge, this is the first study of its kind to comprehensively assess consumers' knowledge of food safety, related behaviours, and their trust in various sources of food safety information. The findings can provide a framework for policymakers and food safety authorities to develop guidelines and conduct education campaigns to provide access to useful sources of information and increase consumers' food safety knowledge. Since this study was conducted across Saudi Arabia, the findings can be generalized to the entire country and to countries similar to Saudi Arabia. Furthermore, the sample size was sufficiently large to obtain useful insights into consumers' interest in food safety and trust in relevant sources of information, as well as their knowledge and perceptions of aspects of food safety and related behaviours.

However, our findings should be interpreted considering certain limitations inherent in the study. First, this was a cross-sectional study; as such, it could not assess trends over time. Second, we assumed that the participants were aware of the food safety risks or various terms used in the questionnaire. Inadequate knowledge of food safety and relevant terminology may have influenced the quality of the responses.

5. Conclusion

The current study sought to assess consumers' trust in sources of food safety and risk information and their knowledge and perceptions of food safety issues. The participants tended to trust national authorities and governments more than celebrities, bloggers, and farmers. Overall, there were no significant differences between the genders in terms of concerns about food safety, whereas there were significant differences in terms of information about food risks. Many study participants showed no interest in food safety, suggesting a need to raise awareness of food safety across Saudi Arabia.

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Conflict of Interest: The author declares that she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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References

1. World Health Organization. Global strategy for food safety 2022-2030. Towards Stronger Food Safety Systems and Global Cooperation 2021; World Health Organization: Geneva, Switzerland.
2. Omari R, Frempong GK, Arthur W. Public perceptions and worry about food safety hazards and risks in Ghana. Food Control 2018; 93: 76-82.
3. World Health Organization. Food safety: What you should know. 2015; World Health Organization; Geneva, Switzerland.
4. Nardi VAM, Teixeira R, Ladeira WJ, de Oliveira Santini F. A meta-analytic review of food safety risk perception. Food Control 2020; 112: 107089.
5. Unnevehr LJ. Addressing food safety challenges in rapidly developing food systems. J Agric Econ 2022; 53(4): 529-539.
6. Angulo AM, Gil JM. Risk perception and consumer willingness to pay for certified beef in Spain. Food Qual Prefer 2007; 18(8): 1106-1117.
7. Lupien JR. Prevention and control of food safety risks: The role of governments, food producers, marketers, and academia. Asia Pac J Clin Nutr 2007; 16(S1): 74-9.
8. Swinnen JF, Vandemoortele T. Are food safety standards different from other food standards? A political economy perspective. Eur Rev Agric Econ 2009; 36(4): 507-23.
9. Kim H-C, Kim M-R. Concerns about hazardous elements on foods and recognition of the roles of government, food producers, and consumers in securing food safety. J East Asian Soc Diet Life 2011; 21(3): 401-17.
10. Ling SJ, Hassan Z, Regina G. Food borne disease and the lifestyles of the students and food handlers in rural schools: A preliminary observation. MJSSH 2021; 6(9): 430-436.
11. Mead PS, Slutsker L, Dietz V, et al. Food-related illness and death in the United States. Emerg Infect Dis 1999; 5(5): 607- 625.
12. Ministry of Health. Health statistics annual book 2012. Available from: https://www.moh.gov.sa/en/Ministry/Statistics/book/Documents/1433.pdf [Accessed 2 January 2023].
13. AL-Mohaithef M. Awareness of foodborne pathogens among students: A cross-sectional study in the Kingdom of Saudi Arabia. Int J Food Sci 2021; 9971748.
14. Röhr A, Lüddecke K, Drusch S, Müller MJ, Alvensleben R. Food quality and safety—Consumer perception and public health concern. Food Control 2005; 16(8): 649-55.
15. Garayoa R, Cordoba M, Garcia-Jalon I, Sanchez-Villegas A, Vitas AI. Relationship between consumer food safety knowledge and reported behavior among students from health sciences in one region of Spain. J Food Prot 2005; 68(12): 2631-6.
16. Sanlier N. The knowledge and practice of food safety by young and adult consumers. Food Control 2009; 20(6): 538-42.
17. Osaili TM, Obeidat BA, Abu Jamous DO, Bawadi HA. Food safety knowledge and practices among college female students in north of Jordan. Food Control 2011; 22 (2): 269-76.
18. Al-Shabib NA, Husain FM, Khan JM. Study on food safety concerns, knowledge and practices among university students in Saudi Arabia. Food Control 2017; 73: 202-8.
19. Almaghrabi MA. Assessing public interest, risk perceptions, and awareness of food safety in Saudi Arabia: A cross-sectional study. Food Control 2023; 109810.
20. European Food Safety. Food Safety in the EU. Special Eurobarometer Wave 2019; EB91, 3.
21. Pintak L, Ginge J. Inside the Arab newsroom: Arab journalists evaluate themselves and the competition. Journal Stud 2009; 10(2): 157-177.
22. Hu W, Qi Y, Hua S. An empirical study on food-safety information needs of consumers in Zhejiang Province. J Hunan Univ Nat Sci 2007; 8(4): 8-11.
23. Wan Y. A survey on consumers' response to food safety information. New West 2008; 14 (9).
24. Liu R, Pieniak Z, Verbeke W. Food-related hazards in China: Consumers' perceptions of risk and trust in information sources. Food Control 2014; 46: 291-8.
25. Taylor AW, Coveney J, Ward PR, et al. The Australian food and trust survey: Demographic indicators associated with food safety and quality concerns. Food Control 2012; 25 (2): 476-83.
26. Slovic P, Gregory R. Risk analysis, decision analysis, and the social context for risk decision making. In: Decision science and technology. Springer; 1999. 353-65.
27. Dosman DM, Adamowicz WL, Hrudey SE. Socioeconomic determinants of health- and food safety-related risk perceptions. Risk Anal 2001; 21(2): 307-18.
28. Diehl DC, Pracht DW, Forthun LF, Simonne AH. Food safety for 4-h youth: A survey of interests and educational methods. J Ext 2010; 48(4): 1-11.
29. Zorba NND, Kaptan M. Consumer food safety perceptions and practices in a Turkish community. J Food Prot 2011; 74(11): 1922-1929.
30. European Food Safety. Food-related risks. Eurosurveillance 2010; 15: 19728.

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