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Knowledge, Risk Perception, and Information Channels Related to Meat Allergy

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Abstract. Alpha-gal syndrome (AGS) is an IgE-mediated allergy characterized by delayed reactions to mammalian meat and related products. We conducted an exploratory online survey to examine knowledge of meat allergy and AGS, perceived food-allergy risk, social-media exposure, trust in information sources, and preferred education channels. Among 352 respondents, the mean knowledge score was 4.25 out of 6. Participants who reported having a good understanding of general medical or health-related knowledge scored higher than those who did not. Knowledge was not significantly associated with perceived risk , whereas reported exposure to food-allergy and meat-allergy content on social media showed positive correlations with perceived risk. Respondents placed greatest trust in clinicians and official medical organizations, but preferred social-media science accounts and short-video platforms for receiving health information. Digital platforms may therefore provide a useful channel for delivering professionally developed public allergy education.

Keywords: alpha-gal syndrome; mammalian meat allergy; health knowledge; risk perception; social media; health communication

1. Introduction & Literature Review

China provides an important setting for this question. A meta-analysis of population-based studies estimated food-allergy prevalence in China at 4.0%-8.2%, with variation by age, region, and study method [1]. AGS has also been documented in China: the first patient with tick-associated delayed red-meat anaphylaxis was reported in 2011, followed by additional clinical reports, although national prevalence and public-awareness data remain unavailable [2]. Digital media are central to information access in China. By December 2024, short-video services were used by 93.8% of Chinese internet users and internet healthcare services by 37.7% [3]. In a large survey conducted in Chongqing, 67.1% of respondents reported seeking health information online, and WeChat was the most commonly reported method among those who did so [4]. These patterns make it useful to examine not only what Chinese respondents know about meat allergy and AGS, but also how social-media exposure and source trust relate to risk perception. The present study addresses the gap between emerging clinical recognition of AGS in China and limited evidence on public knowledge and communication preferences.

Food allergy can involve several organ systems and may progress to anaphylaxis. Its effects also extend beyond acute clinical events: dietary restriction, reduced social participation, and impaired quality of life are common concerns [5-7]. For the public, recognizing possible symptoms and knowing when to seek care are therefore important parts of safe day-to-day management.

Alpha-gal syndrome (AGS) is an IgE-mediated allergy to galactose-alpha-1,3-galactose, typically associated with tick bites and delayed reactions after mammalian meat. Symptoms may include urticaria, gastrointestinal symptoms, angioedema, or anaphylaxis; reactions can also follow exposure to dairy, gelatin, medications, or other mammalian-derived materials [8-12]. The delayed onset and variable triggers may make it difficult for patients to link symptoms to exposure. Although recognition of AGS is increasing, its population burden and public awareness remain uncertain. Awareness gaps have been reported among clinicians, and patients may seek explanations through informal sources [13-16].

Factual knowledge is only one component of health literacy, which also includes finding, judging, and applying information [17]. Risk perception is shaped by perceived susceptibility and severity, but also by emotion, familiarity, and the availability of examples; repeated or vivid messages may

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therefore increase concern without comparable gains in factual understanding [18-20]. This is relevant to social media, where information is often encountered incidentally. Trust and channel preference may also differ: people can value professional sources yet prefer platforms they routinely use [21-23].

1.1 Research Questions

RQ1. What was the distribution of meat-allergy and AGS knowledge scores in the survey sample?

RQ2. How did knowledge scores differ by parenthood, self-reported good understanding of general medical or health-related knowledge, and general education level?

RQ3. How was self-reported exposure to food-allergy and meat-allergy content on social media associated with knowledge?

RQ4. How were knowledge, social-media exposure, and perceived food-allergy risk associated?

RQ5. How did trust ratings for health-information sources compare descriptively with preferred channels for allergy education?

2. Methods

2.1 Study Design and Participants

This cross-sectional survey was administered online in China using convenience recruitment. The questionnaire was created and hosted on Wenjuanxing (Questionnaire Star). The survey link was posted openly on WeChat Moments and on social-media platforms including Xiaohongshu and Douyin; recruitment was not directed toward any specific demographic or professional group. Participation was voluntary. We received 356 questionnaires; four were excluded because information was missing, leaving 352 records for analysis. Because recruitment did not use a defined sampling frame, a conventional response rate could not be calculated.

2.2 Questionnaire and Measures

The study questionnaire, developed after a literature review, covered demographics, knowledge, perceived risk, social-media exposure, information-source trust, and education-channel preferences. The Chinese questionnaire and English translation appear in Appendix A; the scoring key is provided in Supplementary Table 1. Demographic variables were age group, gender, education level, parenthood, and self-reported good understanding of general medical or health-related knowledge.

Knowledge was measured with six multiple-choice items covering allergy symptoms, causes, timing of onset, and mammalian meat allergy. Each correct answer received one point; incorrect and uncertain answers received zero points. Scores could range from 0 to 6 and were analyzed as a continuous variable because no validated cut points or population norms were available.

Perceived food-allergy risk was assessed with five statements rated from 1 (strongly disagree) to 5 (strongly agree). The five responses were averaged to form the scale score. Cronbach's alpha was .886 in the analytic sample.

Social-media exposure was measured separately for general food-allergy content (Q21) and meat-allergy content (Q22). Both items referred to exposure during the previous year and were coded from 1 (never) to 5 (almost every day).

Respondents rated their trust in four information sources: healthcare professionals, official medical institutions, social media, and family or friends. Each source was rated on a five-point scale. A separate multiple-response question asked which channels respondents would prefer for food-allergy education.

2.3 Statistical Analysis

Analyses were performed in Stata 17. Categorical variables are reported as frequencies and percentages, and continuous variables as means, standard deviations, and 95% confidence intervals.

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Knowledge scores were compared by parenthood and self-reported good understanding of general medical or health-related knowledge using independent-samples t tests, and across education levels using one-way analysis of variance. Hedges' g and eta squared are reported as effect sizes. Pearson correlations assessed unadjusted associations among knowledge, perceived risk, and social-media exposure; confidence intervals for r used Fisher's z transformation. Tests were two-sided with alpha = .05, and Holm-adjusted p values were calculated as a sensitivity analysis. No multivariable adjustment was performed.

3. Results

3.1 Participant Characteristics

Among 352 respondents, 59.7% were women, 75.6% reported having children, and 70.7% reported having a good understanding of general medical or health-related knowledge (Table 1). The largest age groups were 41-50 years (25.9%) and 31-40 years (24.4%).

Table 1. Participant characteristics (N = 352)

Age	n (%)	Education	n (%)
Under 18	49 (13.9)	Below middle school	25 (7.1)
18-30	77 (21.9)	High school or secondary school	101 (28.7)
31-40	86 (24.4)	Junior college	80 (22.7)
41-50	91 (25.9)	Undergraduate	99 (28.1)
51-60	38 (10.8)	Master's degree or higher	47 (13.4)
Over 60	11 (3.1)		
Gender	n (%)	Good understanding of general medical	n (%)
Male	142 (40.3)	Yes	249 (70.7)
Female	210 (59.7)	No	103 (29.3)
Has minor children	n (%)		
Yes	266 (75.6)		
No	86 (24.4)		

Note. Percentages may not total 100.0 because of rounding. The gender response options available in the supplied manuscript were male and female.

3.2 Knowledge Scores

Scores on the six-item knowledge measure ranged from 0 to 6, with higher scores indicating more correct responses. Supplementary Table 1 lists the items and scoring rules.

Item	Knowledge domain assessed	Question	Correct answer	Scoring
Q7	Timing of allergic reactions	Which statement about the timing of food-allergy reactions is most reasonable?	Food-allergy reactions may occur from several minutes to several hours after eating.	Correct = 1;
Q8	Trigger sources of meat allergy	Which statement best reflects current medical understanding of meat allergy?	Allergic reactions may occur after eating pork, beef, or lamb.	Correct = 1;
Q9	Clinical manifestations	Which symptom pattern is more likely to be related to meat	A combination of symptoms such as rash, abdominal pain,	Correct = 1; i

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Item	Knowledge domain assessed	Question	Correct answer	Scoring
		allergy?	or breathing discomfort.	
Q11	Clinical recognition and delayed reaction	If a person develops rash or abdominal pain several hours after eating beef for dinner, what might this indicate?	It may be related to meat allergy.	Correct = 1;
Q12	Etiology of alpha-gal syndrome	Which statement about mammalian meat allergy, such as allergy to beef, pork, or lamb, is most reasonable?	It is an immune reaction that may be caused by bites from certain ticks.	Correct = 1;

Supplementary Table 1. Knowledge assessment items for meat allergy and alpha-gal syndrome

The mean knowledge score was 4.25 (SD = 1.26; 95% CI [4.12, 4.38]), and the median was 4 (IQR, 4-5). Of the 352 respondents, 45.5% scored 5 or 6 and 7.7% scored between 0 and 2.

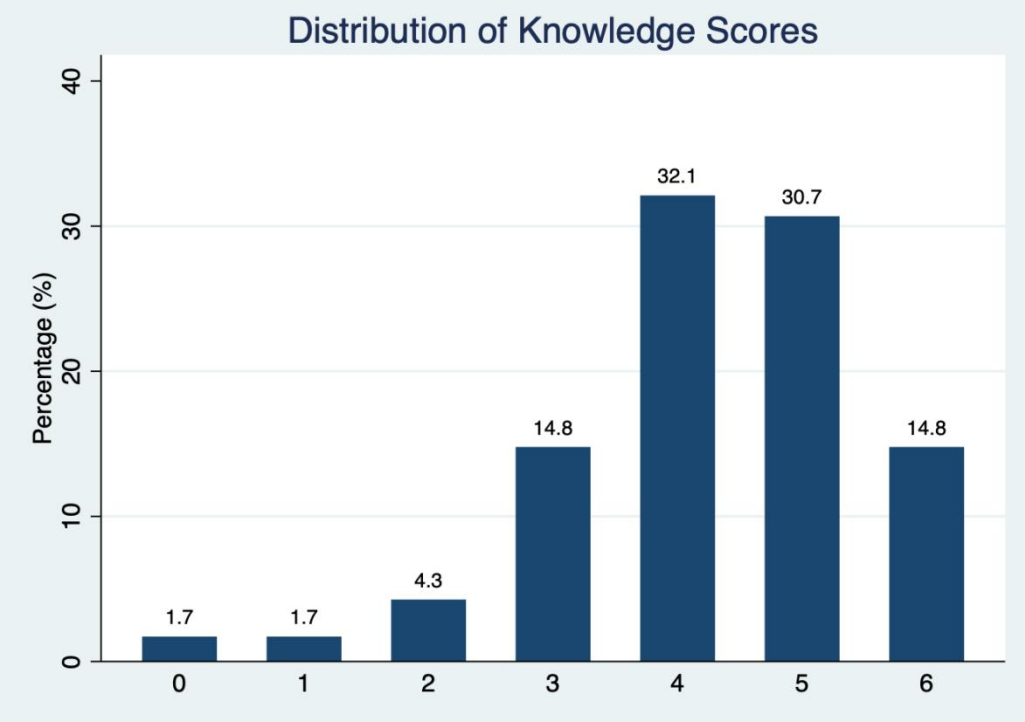


Fig. 1. Distribution of Knowledge Scores

Note. Scores ranged from 0 to 6, with higher scores indicating more correct answers. Bars show the percentage of respondents at each score.

3.3 Unadjusted Group Differences in Knowledge

Respondents who reported having a good understanding of general medical or health-related knowledge scored higher than those who did not (mean difference = 0.67, 95% CI [0.39, 0.95], t(350) = 4.67, p < .001, Hedges' g = 0.55). Knowledge scores did not differ significantly by parenthood (mean difference = 0.21, 95% CI [-0.10, 0.51], t(350) = 1.33, p = .184, Hedges' g = 0.16).

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Table 2. Unadjusted two-group comparisons of knowledge scores

Comparison	Group 1 (n)	M1	Group 2 (n)	M2	Mean diff.	95% CI	t	p	g
Has minor children	Yes (266)	4.301	No (86)	4.093	0.208	[-0.099, 0.515]	1.33	.184	0.16
Good understanding of general medical or health-related knowledge	Yes (249)	4.446	No (103)	3.776	0.669	[0.386, 0.952]	4.67	<.001	0.55

Note. CI = confidence interval; g = Hedges' g. Positive differences indicate a higher mean in Group 1.

Knowledge scores did not differ across the five education levels, F(4, 347) = 0.63, p = .641, eta squared = .007.

Table 3. Knowledge scores by education level

Education level	n	Mean	SD
Below middle school	25	4.520	1.046
High school or secondary school	101	4.218	1.180
Junior college	80	4.325	1.199
Undergraduate	99	4.242	1.348
Master's degree or higher	47	4.064	1.436

Note. Omnibus one-way ANOVA: F(4, 347) = 0.63, p = .641, eta squared = .007.

3.4 Social-Media Exposure, Knowledge, and Perceived Risk

Exposure to general food-allergy content was weakly correlated with knowledge (r = .109, 95% CI [.005, .211], nominal p = .041). The correlation between meat-allergy content exposure and knowledge was slightly larger (r = .190, 95% CI [.087, .289], p < .001). After Holm correction for the five correlations, the association between general food-allergy exposure and knowledge no longer met the .05 threshold (adjusted p approximately .082).

The mean perceived-risk score was 3.75 (SD = 0.97; 95% CI [3.65, 3.86]). Knowledge was not significantly correlated with perceived risk (r = .049, 95% CI [-.056, .153], p = .361). Perceived risk was positively correlated with reported exposure to general food-allergy content (r = .628) and meat-allergy content (r = .555). These unadjusted correlations do not establish the temporal order of exposure and risk perception.

Table 4. Unadjusted correlations among knowledge, social-media exposure, and perceived risk

Variable 1	Variable 2	r	95% CI	Nominal p	Holm p	r^2
Knowledge	General food-allergy exposure	.109	[.005, .211]	.041	.082	.012
Knowledge	Meat-allergy exposure	.190	[.087, .289]	<.001	.001	.036
Knowledge	Perceived risk	.049	[-.056, .153]	.361	.361	.002
Perceived risk	General food-allergy exposure	.628	[.560, .687]	<.001	<.001	.394
Perceived risk	Meat-allergy exposure	.555	[.478, .623]	<.001	<.001	.308

Note. N = 352. CI = confidence interval. Confidence intervals for r use Fisher's z transformation. Holm p values treat the five displayed correlations as one test family and are approximate because the source output rounded r to three decimals.

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Figure 2 shows perceived-risk scores at each level of reported exposure to general food-allergy content on social media.

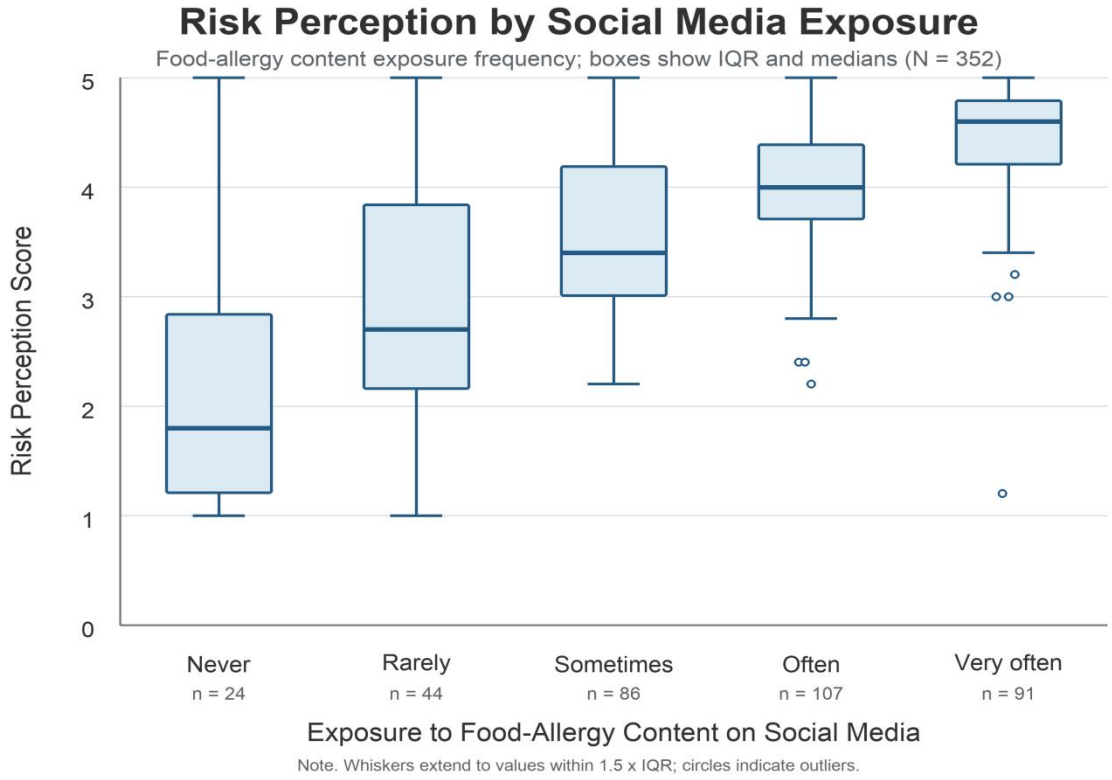


Fig. 2. Risk Perception Scores by Level of Social-Media Exposure

Note. Boxes represent the interquartile range, horizontal lines indicate medians, whiskers extend to values within 1.5 times the interquartile range, and circles indicate outliers. Social-media exposure was positively correlated with risk perception ($r = .628$, $p < .001$; $N = 352$).

3.5 Trust and Preferred Education Channels

Mean trust ratings were highest for official medical institutions and healthcare professionals, followed by social media and family or friends (Table 5). These rankings are descriptive; no repeated-measures test of within-respondent differences was performed.

Table 5. Trust ratings for health-information sources

Source	n	Mean	SD	95% CI
Official medical institutions	352	3.790	1.158	[3.669, 3.911]
Healthcare professionals	352	3.773	1.162	[3.651, 3.895]
Social media	352	3.548	1.064	[3.436, 3.660]
Family or friends	352	3.457	1.131	[3.338, 3.576]

Note. Ratings ranged from 1 to 5; higher values indicate greater trust. Confidence intervals are descriptive and do not test paired differences.

Respondents could select more than one preferred channel. Social-media science accounts (71.6%) and short-video platforms (69.9%) were chosen most often, followed by community health lectures (61.9%), doctors or hospitals (61.6%), and official medical-institution platforms (57.1%).

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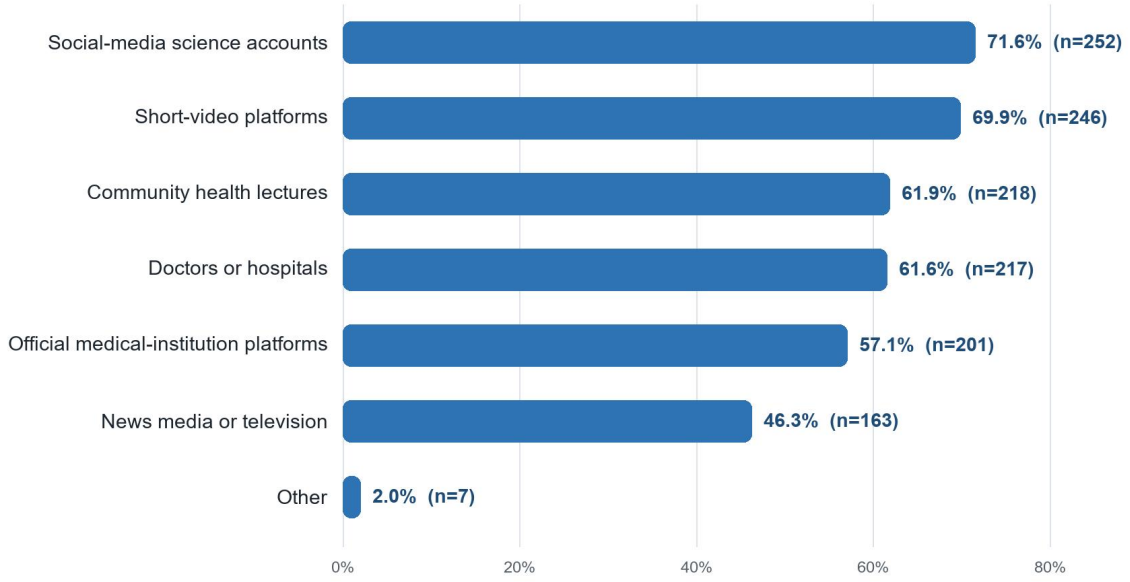


Fig. 3. Preferred Channels for Food-Allergy Education

Note. N = 352. Participants could select more than one channel; percentages therefore do not sum to 100%.

4. Discussion

4.1 Principal Findings

This study offers an exploratory view of meat-allergy and AGS knowledge, risk perception, and information preferences in an online convenience sample. Three findings are most notable. First, the sample answered an average of 4.25 of six knowledge questions correctly, but self-reported good understanding of general medical or health-related knowledge was the only measured characteristic associated with a meaningful score difference. Second, knowledge was essentially unrelated to general food-allergy risk perception, whereas self-reported social-media exposure was strongly associated with perceived risk. Third, respondents rated professional and official sources most highly for trust but most often selected digital platforms as preferred education channels.

4.2 Knowledge and Risk Perception

One of the most interesting findings of this study is that knowledge of meat allergy was not significantly associated with risk perception. At first glance, this result appears counterintuitive. A common assumption in public health education is that increasing knowledge will naturally lead people to take a health issue more seriously. If individuals know more about a disease, understand its causes, and recognize its potential consequences, they should theoretically perceive greater risk. However, the findings of this study suggest that the relationship may be more complicated.

Before interpreting this finding in psychological terms, the composition of the sample should be considered. Because 70.7% of respondents reported having a good understanding of general medical or health-related knowledge, the sample contained a relatively high concentration of health-informed participants. This may have restricted variation in knowledge scores and made an association with risk perception more difficult to detect. This sampling explanation and the possibility of psychological distance are complementary rather than mutually exclusive, and both may have contributed to the weak correlation.

Knowledge does not always lead to concern when a condition feels remote. Meat allergy is still unfamiliar and is often seen as uncommon. Respondents may therefore recognize delayed reactions

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or tick-associated sensitization without feeling personally at risk. This interpretation fits the Health Belief Model: perceived susceptibility and severity, rather than factual knowledge alone, shape risk perception [18,19].

I would like to make clear,though, that although knowledge was not significantly associated with perceived risk in this study, this finding should not be interpreted as indicating that knowledge is unimportant. The knowledge score used in this study was designed to capture several fundamental dimensions of public understanding of meat allergy and Alpha-gal syndrome, particularly relevant because public recognition of this condition depends not only on knowing that meat allergy exists, but also on understanding the unusual characteristics that distinguish it from more familiar food allergies. For example, delayed symptom onset may prevent individuals from connecting allergic reactions with previous meat consumption, while limited awareness of tick-associated sensitization may make the underlying cause difficult to recognize. Therefore, a person may demonstrate relatively good factual knowledge while still perceiving the condition as personally irrelevant or unlikely to occur.

4.3 Social-Media Exposure and Perceived Risk

If knowledge alone is insufficient, the next question becomes: what does? The findings of this study suggest that social media exposure may be one important part of the answer. Unlike knowledge scores, which showed no significant association with risk perception, exposure to food allergy–related and meat allergy–related content on social media demonstrated a strong positive relationship with perceived risk. This contrast suggests that the factors shaping risk perception may be different from those shaping factual understanding.

One possible explanation is that social media does more than simply communicate information. It also influences what people pay attention to. Traditional health education often assumes that risk perception develops through the accumulation of knowledge. However, social media content is frequently presented through stories, personal experiences, visual demonstrations, headlines, and emotionally engaging narratives rather than detailed scientific explanations. For relatively unfamiliar conditions such as meat allergy and Alpha-gal syndrome, individuals may not develop a strong sense of concern simply by learning biomedical facts. By contrast, exposure to a real patient story or a vivid example may make the condition feel more concrete, visible, and relevant.

In this sense, social media may help transform an unfamiliar health issue into one that becomes increasingly present in everyday life. Repeated exposure can gradually bring a condition into public awareness, even when it would otherwise remain outside people’s routine health concerns.

The findings may also reflect a broader insight from risk perception research. Scholars such as Slovic have argued that people do not evaluate risks solely through analytical reasoning. Instead, risk judgments are shaped by emotion, familiarity, personal experience, and the ease with which examples can be recalled. A risk that is frequently encountered, discussed, or imagined tends to feel more important than a risk that remains abstract, regardless of how much information is available. [20]

From this perspective, social media exposure may influence risk perception by increasing salience. The findings therefore suggest that visibility may be a critical precursor to risk perception, particularly for emerging and relatively unfamiliar health conditions such as meat allergy.

4.4 Trust, Channel Preference, and Communication Practice

Lastly , a notable finding of this study is the apparent gap between trust and channel preference. Respondents reported the highest levels of trust in official medical institutions and healthcare professionals, yet social media accounts and short-video platforms were the most preferred channels for receiving food allergy information. At first glance, this finding appears contradictory. If healthcare professionals are considered the most trustworthy sources of information, why do people prefer to receive information elsewhere?

One possible explanation is that trust and information exposure are fundamentally different processes. Public health communication often assumes that individuals who need information will

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actively seek it from reliable sources. However, for relatively unfamiliar conditions such as meat allergy, most members of the public have little reason to deliberately search for information. They may have never experienced symptoms, received a diagnosis, or known someone affected by the condition. As a result, information is often acquired not through active searching, but through incidental exposure.

This pattern is consistent with the concept of information encountering, which suggests that individuals frequently acquire useful information unexpectedly while engaged in other activities rather than through intentional information seeking [21]. In the context of meat allergy, many respondents may have encountered information while scrolling through social media feeds rather than actively searching for it. This suggests that the challenge of public awareness may not simply be providing accurate information, but ensuring that information becomes visible enough to enter public attention in the first place.

The finding can be further understood through Uses and Gratifications Theory, which argues that media users select communication channels based on the needs those channels satisfy rather than solely on the quality of the information they provide [23]. In the context of health communication, individuals may not always choose the most authoritative source of information. Instead, they often choose the channels that are most accessible, convenient, and integrated into their everyday routines.

This perspective may help explain why respondents in the present study expressed greater trust in healthcare professionals and official medical institutions while simultaneously preferring social media and short-video platforms as channels for receiving food allergy information. Trust and media use appear to reflect different decision-making processes. When evaluating information credibility, respondents may rely on professional expertise and institutional authority. However, when deciding where to consume information in daily life, convenience, accessibility, and habitual media use may become more important considerations.

Taken together, these findings suggest that effective public education on meat allergy should not be framed as a choice between professional institutions and social media platforms. The two appear to serve different but complementary functions within the communication process. Professional institutions and healthcare professionals provide scientific authority, credibility, and evidence-based information. However, credibility alone cannot improve public awareness if information fails to reach its intended audience. Conversely, social media platforms provide visibility, accessibility, and access to public attention, but visibility alone does not guarantee informational quality.

5. Conclusion

In this convenience sample, knowledge of meat allergy and AGS was not significantly associated with general food-allergy risk perception. Reported exposure to allergy-related content on social media, however, was positively correlated with perceived risk. Respondents gave the highest trust ratings to professional and official medical sources, while digital platforms were the most frequently selected channels for receiving allergy education.

These findings support dissemination of professionally reviewed allergy information through widely used social-media and short-video platforms, with clear attribution to clinical or public-health sources .However, the results should be interpreted cautiously. 70.7% of respondents reported having a good understanding of general medical or health-related knowledge, an unusually high proportion that is unlikely to represent the wider population. Their overrepresentation may have raised the overall knowledge score, reduced variation in knowledge, and limited the generalizability of the findings. The cross-sectional design cannot establish the direction of the observed associations. The study also relied on self-reported exposure and a researcher-developed knowledge measure. Future studies should recruit more diverse samples, evaluate the validity of the knowledge measure, and test whether professionally produced digital education changes knowledge or risk perception over time.

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6. Declarations

Ethics approval and consent to participate. Electronic informed consent was obtained from all adult participants, and parental consent and participant assent were obtained for respondents younger than 18 years.

References

[1] Feng, H., Luo, N., Xiong, X., & Wu, Y. (2023). Prevalence of food allergy in the Chinese population: A systematic review and meta-analysis of population-based studies. Allergy & Asthma Proceedings, 44(5), 315-325. https://doi.org/10.2500/aap.2023.44.230039

[2] Zhan, M., Chen, S., Xu, T., Yin, J., Li, H., Pan, Z., Cui, N., & Wen, L. (2024). Alpha-gal syndrome. Chinese Medical Journal, 137(10), 1234-1236. https://doi.org/10.1097/CM9.0000000000003063

[3] China Internet Network Information Center. (2025). The 55th Statistical Report on China's Internet Development. https://www.cnnic.com.cn/IDR/ReportDownloads/202505/P020250514564119130448.pdf

[4] Rong, H., Lu, L., He, M., Guo, T., Li, X., Tao, Q., Li, Y., Zheng, C., Zhang, L., Li, F., Yi, D., Lei, E., Luo, T., Yang, Q., & Chen, J.-A. (2025). Online health information-seeking behaviors among the Chongqing population: Cross-sectional questionnaire study. JMIR Formative Research, 9, e56028. https://doi.org/10.2196/56028

[5] Savage, J., & Johns, C. B. (2015). Food allergy: Epidemiology and natural history. Immunology and Allergy Clinics of North America, 35(1), 45-59. https://doi.org/10.1016/j.iac.2014.09.004

[6] Gupta, R. S., Warren, C. M., Smith, B. M., Jiang, J., Blumenstock, J. A., Davis, M. M., Schleimer, R. P., & Nadeau, K. C. (2019). Prevalence and severity of food allergies among US adults. JAMA Network Open, 2(1), e185630. https://doi.org/10.1001/jamanetworkopen.2018.5630

[7] Forero Molina, M. A., Kram, Y. E., & Lanser, B. J. (2025). The global burden of food allergy. Immunology and Allergy Clinics of North America, 45(3), 325-337. https://doi.org/10.1016/j.iac.2025.04.002

[8] Commins, S. P., James, H. R., Kelly, L. A., Pochan, S. L., Workman, L. J., Perzanowski, M. S., Kocan, K. M., Fahy, J. V., Nganga, L. W., Rönmark, E., Cooper, P. J., & Platts-Mills, T. A. E. (2011). The relevance of tick bites to the production of IgE antibodies to the mammalian oligosaccharide galactose-alpha-1,3-galactose. Journal of Allergy and Clinical Immunology, 127(5), 1286-1293.e6. https://doi.org/10.1016/j.jaci.2011.02.019

[9] Platts-Mills, T. A. E., Li, R. C., Keshavarz, B., Smith, A. R., & Wilson, J. M. (2020). Diagnosis and management of patients with the alpha-gal syndrome. The Journal of Allergy and Clinical Immunology: In Practice, 8(1), 15-23.e1. https://doi.org/10.1016/j.jaip.2019.09.017

[10] Commins, S. P., James, H. R., Stevens, W., Pochan, S. L., Land, M. H., King, C., Mozzicato, S., & Platts-Mills, T. A. E. (2014). Delayed clinical and ex vivo response to mammalian meat in patients with IgE to galactose-alpha-1,3-galactose. Journal of Allergy and Clinical Immunology, 134(1), 108-115.e11. https://doi.org/10.1016/j.jaci.2014.01.024

[11] Commins, S. P. (2020). Diagnosis and management of alpha-gal syndrome: Lessons from 2,500 patients. Expert Review of Clinical Immunology, 16(7), 667-677. https://doi.org/10.1080/1744666X.2020.1782745

[12] Patel, C., & Iweala, O. I. (2020). "Doc, will I ever eat steak again?": Diagnosis and management of alpha-gal syndrome. Current Opinion in Pediatrics, 32(6), 816-824. https://doi.org/10.1097/MOP.0000000000000955

[13] Thompson, J. M., Carpenter, A., Kersh, G. J., Wachs, T., Commins, S. P., & Salzer, J. S. (2023). Geographic distribution of suspected alpha-gal syndrome cases—United States, January 2017-December 2022. Morbidity and Mortality Weekly Report, 72(30), 815-820. https://doi.org/10.15585/mmwr.mm7230a2

[14] Carpenter, A., Drexler, N. A., McCormick, D. W., Thompson, J. M., Kersh, G. J., Commins, S. P., & Salzer, J. S. (2023). Health care provider knowledge regarding alpha-gal syndrome—United States,

ISSN: 3007-9640 DOI: https://doi.org/10.70114/acmsr.2026.9.1.P59
March-May 2022. Morbidity and Mortality Weekly Report, 72(30), 809-814. https://doi.org/10.15585/mmwr.mm7230a1

[15] Flaherty, M. G., Threats, M., & Kaplan, S. J. (2020). Patients' health information practices and perceptions of provider knowledge in the case of the newly discovered alpha-gal food allergy. Journal of Patient Experience, 7(1), 132-139. https://doi.org/10.1177/2374373518808310

[16] Sempa, J., Brenes, P., Tegeler, A., Looper, J., Chao, M., & Park, Y. (2025). Alpha-gal syndrome in the Heartland: Dietary restrictions, public awareness, and systemic barriers in rural Kansas. Nutrients, 17(19), 3043. https://doi.org/10.3390/nu17193043

[17] Sørensen, K., Van den Broucke, S., Fullam, J., Doyle, G., Pelikan, J., Slonska, Z., & Brand, H. (2012). Health literacy and public health: A systematic review and integration of definitions and models. BMC Public Health, 12, 80. https://doi.org/10.1186/1471-2458-12-80

[18] Rosenstock, I. M. (1974). The Health Belief Model and preventive health behavior. Health Education Monographs, 2(4), 354-386. https://doi.org/10.1177/109019817400200405

[19] Janz, N. K., & Becker, M. H. (1984). The Health Belief Model: A decade later. Health Education Quarterly, 11(1), 1-47. https://doi.org/10.1177/109019818401100101

[20] Slovic, P., Finucane, M. L., Peters, E., & MacGregor, D. G. (2004). Risk as analysis and risk as feelings: Some thoughts about affect, reason, risk, and rationality. Risk Analysis, 24(2), 311-322. https://doi.org/10.1111/j.0272-4332.2004.00433.x

[21] Erdelez, S. (1999). Information encountering: It's more than just bumping into information. Bulletin of the American Society for Information Science and Technology, 25(3), 26-29. https://doi.org/10.1002/bult.118

[22] Chen, J., & Wang, Y. (2021). Social media use for health purposes: Systematic review. Journal of Medical Internet Research, 23(5), e17917. https://doi.org/10.2196/17917

[23] Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and gratifications research. Public Opinion Quarterly, 37(4), 509-523. https://doi.org/10.1086/268109

Appendix A. Questionnaire

Public Awareness of Allergy and Related Health Knowledge

Dear participant, this questionnaire aims to understand public awareness of meat allergy. This survey is for academic research only. Responses are anonymous, and all data will be used only for statistical analysis. Thank you for your participation.

Demographic Characteristics

1. What is your age? [Single choice]

□ Under 18 years □ 18-30 years □ 31-40 years
□ 41-50 years □ 51-60 years □ Over 60 years

2. What is your gender? [Single choice]

□ Male □ Female

3. What is your highest level of education? [Single choice]

□ Middle school or below □ High school or secondary vocational school
□ Junior college □ Bachelor's degree □ Master's degree or higher

4. Do you have children? [Single choice]

□ Yes □ No

5. If you have children, what is the age range of your child or children? [Single choice]

□ 0-6 years □ 7-18 years □ 18 years or older □ I do not have children

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6. Do you have a good understanding of general medical or health-related knowledge? [Single choice]

□ Yes □ No

Knowledge Assessment

Please answer the following questions according to your current understanding. This section is used only to assess public awareness of the research topic.

7. Which statement about the timing of food-allergy reactions is most reasonable? [Single choice]

□ Food-allergy reactions usually occur within a few minutes after eating.
□ Food-allergy reactions may occur from several minutes to several hours after eating.
□ Food-allergy reactions usually occur only on the following day.
□ Uncertain

8. Which statement best reflects current medical understanding of meat allergy? [Single choice]

□ Only genetic factors can cause meat allergy.
□ Allergic reactions may occur after eating pork, beef, or lamb.
□ Only food additives can cause food allergy.
□ Uncertain

9. Which symptom pattern is more likely to be related to meat allergy? [Single choice]

□ Only mild skin itching.
□ A combination of symptoms such as rash, abdominal pain, or breathing discomfort.
□ Only fever.
□ Uncertain

10. Which statement about allergens is closest to medical fact? [Single choice]

□ Only a few common foods, such as peanuts and seafood, can cause allergy.
□ Some people may develop an immune reaction to mammalian meat.
□ Allergy can be prevented by cooking, seasoning, or otherwise processing meat.
□ Uncertain

11. If a person develops rash or abdominal pain several hours after eating beef for dinner, what might this indicate? [Single choice]

□ It is only a common skin problem. □ It may be related to meat allergy.
□ It must be food poisoning. □ Uncertain

12. Which statement about mammalian meat allergy, such as allergy to beef, pork, or lamb, is most reasonable? [Single choice]

□ It is determined by genetic factors.
□ It is an immune reaction that may be caused by bites from certain ticks.
□ It is caused by improper cooking or spoiled food.
□ It is caused by long-term high intake of red meat.
□ Uncertain

Prior Awareness and Risk Perception

13. Before participating in this questionnaire, how familiar were you with meat allergy? [Single choice]

1 = Had never heard of it; 5 = Very familiar, including prevention or intervention measures

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14. I think food allergy is a relatively common health problem. [Single choice]

1 = Strongly disagree; 5 = Strongly agree

15. I think food allergy may pose serious health risks. [Single choice]

1 = Strongly disagree; 5 = Strongly agree

16. Even foods that are commonly eaten in daily life may trigger allergic reactions. [Single choice]

1 = Strongly disagree; 5 = Strongly agree

17. I think it is necessary to understand food-allergy-related knowledge. [Single choice]

1 = Strongly disagree; 5 = Strongly agree

18. If I experience physical discomfort, such as skin itching or abdominal pain, I would consider whether it might be related to food. [Single choice]

1 = Strongly disagree; 5 = Strongly agree

Social-Media Exposure

19. Have you seen popular science or educational content about "food allergy" or "allergic reactions" on social media? [Single choice]

1 = Strongly disagree; 5 = Strongly agree

20. Have you seen popular science or educational content about "meat allergy" or similar topics on social media? [Single choice]

1 = Strongly disagree; 5 = Strongly agree

21. In the past year, how often have you encountered popular science or educational content about "food allergy" or "allergic reactions" on social media? [Single choice]

□ Never □ Rarely, less than once per month
□ Occasionally, 1-3 times per month □ Often, more than once per week
□ Almost every day

22. In the past year, how often have you encountered popular science or educational content about "meat allergy" or similar topics on social media? [Single choice]

□ Never □ Rarely, less than once per month
□ Occasionally, 1-3 times per month □ Often, more than once per week
□ Almost every day

Education Needs and Preferred Channels

23. After learning about the relevant information in this questionnaire, do you think it is necessary to strengthen public education about food allergy? [Single choice]

1 = Very necessary; 5 = Not necessary at all

24. If food-allergy education content were available, through which channels would you prefer to receive it? [Multiple choice]

□ Hospitals or doctors □ Official medical-institution platforms
□ Short-video platforms □ Social-media science communication accounts
□ News media or television programs □ School or community health lectures
□ Other: _____

25. Would you be willing to watch or follow health education content about "food allergy"? [Single choice]

1 = Very willing; 5 = Completely unwilling

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Trust in Information Sources (1 = Do not trust at all; 5 = Trust very much)

26. How much do you trust health education content provided by hospitals or doctors? [Single choice]

27. How much do you trust health education content from official medical-institution platforms, such as Centers for Disease Control and Prevention websites? [Single choice]

28. How much do you trust health education content from social-media health science accounts, such as Douyin or Weibo accounts? [Single choice]

29. How much do you trust health-related information shared by family members or friends? [Single choice]

Note

The questionnaire was administered in Chinese. The English version below is provided as a translation for publication.

Knowledge items Q7-Q12 were scored as correct = 1 and incorrect or uncertain response = 0. The total knowledge score ranged from 0 to 6, with higher scores indicating more correct answers.

Unless otherwise specified, Likert-type items were coded from 1 to 5 according to the anchors shown above.