

A Cross-Regional Study on the Public's Channel Preferences for Accessing Information

Jia Chen¹, Lin Wang¹

¹Department of Library and Information Science, Incheon National University, 119 Academy-ro, Yeonsu-gu, Incheon 22012, South Korea

Correspondence: Lin Wang, Department of Library and Information Science, Incheon National University, 119 Academy-ro, Yeonsu-gu, Incheon 22012, South Korea.

Received: August 29, 2024

Accepted: October 9, 2024

Online Published: October 14, 2024

doi:10.11114/smc.v12i4.7149

URL: <https://doi.org/10.11114/smc.v12i4.7149>

Abstract

In this study, an online questionnaire was administered simultaneously in Beijing and Seoul to investigate the public's channel preferences for air quality index (AQI) information and risk perception of air pollution in order to comparatively analyze the public's information acquisition behaviors in different media environments. As people become more aware of the health risks of air pollution, the AQI has become routine information released when there is a need to warn of health hazards, and many countries are releasing it to the public through a variety of information channels to ensure that the public can perceive the risks and take appropriate measures in a timely manner. This study, through a comparative cross-regional analysis, found that public preferences for accessing AQI information varied across regions with differing media environments. In addition, the correlation between air pollution risk perceptions and information access behaviors varied across regions.

Keywords: preference of information channels; multimedia environment, information access behaviour, air quality index; risk perception, cross regional study

1. Introduction

The all-encompassing multimedia environment has greatly changed the communication of public events. In the era of traditional media, the dissemination of public events was limited by the coverage of mass media. In the new media era, information can be quickly conveyed to the audience through multimedia channels, such as online media, social media, mobile media, etc., ensuring the immediacy of the information (Hu & Tian, 2020). Media is not only a channel for information transmission, but also a guide of social opinion and a disseminator of crisis warnings. Understanding the public's media use habits in obtaining information about public events will help local governments understand the public's needs and concerns for getting information in a timely manner, and quickly respond to and deliver relevant information to support an effective response to public events.

Air pollution caused by global industrialization development seriously threatens the public's life, work, and health (Xing et al., 2016; Wang et al., 2020), and air problems are rapidly entering the public eye as an environmental risk. Governments began to use the air quality index (AQI) to monitor air pollution conditions, which allows the public can perceive the health risks. When the AQI is high, risk-perceiving sensitive people can take necessary protective measures in advance, such as reducing exposure by not going outside and wearing masks, to reduce health risks (Wahlberg & Sjoberg, 2000; Paek & Hove, 2017). Data from the Health Impact Institute (2019) showed that Asia has one of the highest burdens of disease due to air pollution. Both China and South Korea keep the public updated on AQI through a full range of information channels, not only in the news media, but also in real-time outdoor broadcasts and mobile media, to facilitate the public's timely response. Studies have shown that the most common access channels for the public to obtain information during public events with risk of harm are through government, friends and relatives, mass media, and social media (Zhuang et al., 2020). In this paper, through a cross-regional study in Beijing and Seoul, we comparatively investigated the public's information channel preferences for obtaining AQI from news media, mobile push notifications, real-time monitoring programs, social media, and interpersonal communication, and then analyzed the correlation between the frequency of obtaining information and the perception of risk.

2. Literature Study

With the rise of the Internet, mobile media and social media, the public's access to information has increasingly diversified (Pearce et al., 2019). Each medium has its own strengths and weaknesses in terms of coverage, utilization, credibility, authenticity, timeliness, practicality, ease of use, and ease of interaction (Li et al., 2020), and the public in the all-media era has more choices of information access channels, arising from different preferences of information channels and diverse reliance on information content and dissemination methods (Niu et al., 2020). The range of applicability of different media varies, and different individuals may choose the same or dissimilar channels as sources of information, and the same individual may choose one or more information channels (Zhang et al., 2012). In public events with perceived risks, traditional media is considered the most widely used source of information (Ali, et al., 2020), and interpersonal communication among family and friends and mobile messaging by government agencies are also the preferred sources of information for the public (Soroya et al., 2021; Dryhurst et al., 2022). An information source that can effectively stimulate a positive response from the public can have limited effectiveness if it is in a communication channel that deviates from the public's preferences (Hyer & Covelto 2007). Previous scholars have studied the public's information access preferences during the occurrence of specific hazardous public events (Sellnow et al., 2009), as well as information access behavior and frequency at different time points over the whole period of a public event, such as 1) before the disaster, 2) when evacuation was decided, 3) when the disaster peaked, 4) after the peak but before the disaster was over, and 5) after the disaster was over (Zhuang et al., 2020). However, studies on channel preferences for accessing routine early warning information, such as air pollution forecasts, are still rare.

The media is the best place to shape public perceptions of environmental problems and explore solutions (Debahuti & Tilak, 2020), and it influences the public's understanding of environmental pollution and directs the public to practical solutions to the problems they highlight (Shapiro & Bolsen, 2018). The public's risk perception and behavioral choices about the environment are influenced by the media (Wang, 2019). The AQI is not just an index of air pollution, but also an indicator of health hazards, Air quality forecasting is to let the public know in advance the air quality condition in the coming period through various information channels. Indicators such as AQI help the public to perceive whether there is a potential threat to health, so that they can take appropriate protective measures (e.g., Johnson, 2012; Kim et al., 2012). Media plays a key role in influencing the public's awareness of potential risks in public events, and the media factors that influence the public's risk perceptions include the amount of media coverage, the frames used for describing risks, the valence and tone of media coverage, the media sources and their perceived trustworthiness, the formats in which risks are presented; and the media channels and types (McCarthy et al., 2008). Media communication also plays a mediating role in the public's perception of environmental risks and coping behaviours (Mileti & Fitzpatrick 1992), and some studies have shown that it not only constructs risk perceptions, but also magnifies the impact of risk perceptions on behavioral choices (Kasperson, 2012). Some studies have pointed out that there are large differences in environmental risk amplification effects among different media channels, with traditional media presenting more neutral attitudes towards constructed risk issues, while new media amplify risk perceptions due to the dissemination of radical attitudes (Zeng et al., 2015). However, rarely have studies investigated the public's media use behaviour in relation to routine warning messages in a multimedia environment, e.g. what are the preferred channels for obtaining information, and whether there is a relationship between the number of channels and frequency of public exposure to information and risk perception.

3. Method

This study used online random sampling to collect data in Beijing (China) and Seoul (Korea), two metropolitan areas that share the commonalities of being densely populated areas, heavily affected by air pollution, and having a high level of public concern about AQI. Informed consent was obtained from all participants, and participants could choose whether or not to participate in the study by clicking on the button labelled "Consent"; a total of 616 questionnaires were collected. After excluding incomplete and invalid questionnaires, a total of 599 valid questionnaires were obtained (validity rate = 97.2%). There were 305 (50.9%) participants from the Beijing region and 294 (49.1%) from the Seoul region in this study. Of the participants from these two regions, 255 (42.6%) were male and 344 (57.4%) were female.

The questionnaire investigated the degree of frequency of access to AQI and the number of channels preferred by the respondents. It also investigated specifically which information access channels were preferred from the following options: 1) News media, 2) Real-time monitoring programs, 3) Mobile push notifications, 4) Interpersonal communication, 5) Social media. At the same time, the Likert five point scale was used to examine the public's risk perception of haze through descriptive questions to measure the public's sensitivity, the extent of concern, and the severity of health hazards caused by (Cronbach's α coefficient was 0.652), Cranach's alpha coefficient would guarantee the scale's reliability (Nunnally & Bernstein 1994; Long & Khoi 2020), further analysis was conducted.

4. Results and Discussion

4.1 Chi Square Test of the Use of Information Channels in Different Regions

First, the media usage of the two regional samples was comparatively analyzed using the chi-square test to see if there is a significant difference in the public's preference for the use of each information channel, with $P < 0.05$ indicating that the difference is statistically significant. The data was analyzed separately for the whole respondents, as well as for the different gender groups of male respondents and female respondents.

Table 1. Comparison of use of information channels by gender in different regions

Samples	Information access channels	N	Beijing N (%)	Seoul N (%)	χ^2	P
Whole	① News media	388	266(87.2)	122(41.5)	137.122	0.000
	② Real-time monitoring programs	276	140(45.9)	136(46.3)	0.008	0.930
	③ Mobile push notifications	374	183(60)	191(65)	1.574	0.210
	④ Social media	204	130(42.6)	74(25.2)	20.304	0.000
	⑤ Interpersonal communication	103	54(17.7)	49(16.7)	0.133	0.736
Male	① News media	159	99(87.6)	60(42.3)	55.148	0.000
	② Real-time monitoring programs	116	46(40.7)	70(49.3)	1.872	0.171
	③ Mobile push notifications	152	61(54)	91(64.1)	2.667	0.102
	④ Social media	83	43(38.1)	40(28.2)	2.800	0.094
	⑤ Interpersonal communication	32	16(14.2)	16(11.3)	0.479	0.489
Female	① News media	229	167(87.0)	62(40.8)	81.332	0.000
	② Real-time monitoring programs	160	94(49.0)	66(43.4)	1.046	0.307
	③ Mobile push notifications	222	122(63.5)	100(65.8)	0.187	0.665
	④ Social media	121	87(45.3)	34(22.4)	19.586	0.000
	⑤ Interpersonal communication	71	38(19.8)	33(21.7)	0.191	0.662

Chi square test, $P < 0.05$ is considered statistically significant.

As Table 1 showed that for the whole sample, the difference in the use of News media between the two regions was statistically significant ($p < 0.05$), with the percentage of official news use in the Beijing sample (87.2%) being significantly higher than that in the Seoul sample (41.5%). Beijing is an area with more serious haze pollution, and the government often releases the public's living and working arrangements in hazy weather through the authoritative news media, which fosters the public's tendency to obtain more comprehensive information about air pollution from the news media.

Social media was another information channel for obtaining AQI for the Beijing sample (42.6%), which was significantly higher than that for the Seoul sample (25.2%). Here, we take a comparative look at the characteristics of social media that have the widest coverage in the two places. WeChat is not only a chatting program in China, but also a content platform containing both private and public traffic, making it the main information channel for the local population to learn about various social events in the first place. On the contrary, Kakaotalk in Korea has a relatively low probability of local users being informed of social events due to the lack of a content dissemination.

Both regional samples did not differ significantly in their use of real-time monitoring programs and mobile push notifications. Mobile push notification and real-time monitoring programs were the most important channels for the public to learn about AQI in Seoul. Mobile push notifications are effective since all individuals of the public get information about the AQI, regardless if they are concerned; the push notifications will alert individuals when the air quality is seriously polluted. Unlike the China National Early Warning Release System, which mainly focuses on natural disasters, the Korean Public Alert System also includes air raid warnings, fire warnings, and alerts on terrorism and radioactive leaks (Wu et al., 2023). The push-based information dissemination channels have permeated the daily lives of Koreans and become an important way for the public to obtain information about various emergencies or disasters in the first instance.

Interpersonal communication was the channel through which the public was least informed about AQI, and there was no significant difference in the two regions, both being less than 20%. Yet, women were more likely than men to use this

channel to keep track of air quality conditions. As a final point, the results of the comparison by gender are generally consistent across regions, except that the male group is not significantly different between the two regions in terms of social media use.

4.2 Descriptive Statistics and T-test of Perceived Risk Variables

For the risk perception level indicator (Table 2), the descriptive statistics showed that the whole sample of respondents was in the medium to high level of risk perception of haze air pollution (M=3.26, SD=0.61).

Table 2. Descriptive statistics and T-test analysis of perceived risk variables

Samples	N	M	SD	t	P
Beijing	305	3.28	0.61	0.779	0.436
Seoul	294	3.24	0.62		

T-tests were conducted to compare the significance of the differences between the means of the indicators in Beijing and Seoul, and as shown in the statistical results in Table 2, the public's risk perceptions with the changes in AQI in the two regions of Beijing (M=3.28, SD=0.61) and Seoul (M=3.24, SD=0.62) were relatively consistent and had no significant differences (P>0.05). The public in the two regions did not show differences in their risk perceptions in response to changes in the AQI, and both were concerned about the damage to health caused by air pollution.

4.3 Correlation Analysis Between Media Access Frequency, Number of Channels Used and Risk Perception

Next, we analyze the correlation between the public's risk perception and media information channel preferences to gain a clearer understanding of how the public behaves in accessing information based on their perception of risk. This analysis provides data to understand the optimization of emergency management and information dissemination, and make the communication between the government and the public more effective. Before the analyzing the data, the frequency of access to information was converted into a score from 1 to 5, where higher scores indicated more frequent access to information. Next, the correlation between frequency of access, number of information channels, and risk perception was analyzed using Spearman correlations.

Table 3. Correlation results between Frequency of access, Number of information channels and Risk perception

Samples		Frequency of access	Number of information channels	Risk perception
Whole	Frequency of access	1		
	Number of information channels	-0.065	1	
	Risk perception	0.075	-0.055	1
Beijing	Frequency of access	1		
	Number of information channels	0.088	1	
	Risk perception	-0.007	-0.217**	1
Seoul	Frequency of access	1		
	Number of information channels	-0.093	1	
	Risk perception	0.140*	0.087	1

Note: ** Correlation is significant at the 0.01 level (2-tailed), * Correlation is significant at the 0.05 level (2-tailed).

As shown in Table 3, there was no significant correlation (significance p>0.05) between Frequency of access, Number of information channels and Risk perception in the whole sample. In Beijing, perceptions of risk increased, and instead of choosing to learn about air quality through more information channels, the public tended to focus on a centralized information channel. This finding is in line with the findings of previous scholars that the public tends to focus on authoritative and reliable information sources when encountering dangerous public events (Sellnow et al., 2009), and that official channels are significantly more credible than interpersonal communication and WeChat media in China (Zhang et al., 2020). In Seoul, however, the stronger the public perception of risk, the more they tend to check the AQI frequently for the latest index changes. The public in different socio-cultural regions exhibited distinct behaviors in acquiring information.

5. Conclusions

This cross-regional study in Beijing and Seoul analyzed the media channel use behavior of the public in the two regions in accessing AQI-related information. The findings of this study have many implications. First, regarding study

methodology, the cross-sectional study design provides a framework for cross-cultural and cross-national comparative research methodology by collecting data on public media channel usage preferences in both countries during the same time period.

Theoretically, this study fills a research gap on the media use behavior of how the public accesses daily warning information across channels before a crisis situation occurs. The results of the study show both homogeneity and heterogeneity in the public's channel preferences for accessing information in different media environments in different regions. In a multimedia information environment, each media channel, including interpersonal communication, is an effective information channel with a user base. Interpersonal communication is considered to be the most effective channel of information exchange in the event of a disaster, but it is not an effective channel for reaching the public for warning messages that are routinely issued regardless of hazards. Interpersonal communication is considered to be the most effective channel of information exchange in the event of a disaster (Austin et al., 2012), but it is not an effective channel for reaching the public to provide warning information that is routinely released regardless of whether there is a hazard or not. In addition, by analyzing the correlation between the public's risk perceptions and media channel preferences for information, the results of this study can help policymakers better understand how the public prefers to access information pertaining to AQI. The correlation between the public's perception of risk and media channel preferences can help policymakers better understand how the public chooses information sources based on their perception of risk. The results of the study show that when risk was perceived, the correlation between risk perception and public media use behavior was different between China and Korea. As the perceived risk of air pollution increased, the public in Beijing focused more on AQI-related information released through authoritative media, while the public in Seoul tended to access information more frequently. This finding provides support for the optimization of emergency management and information dissemination to make emergency response more effective.

In terms of policy recommendations, governments should focus on strengthening the main information dissemination channels according to the preferences of audiences in their respective countries. This study found that mobile media is an effective information channel for the public to learn about risk information on a daily basis, reaching a high percentage of the population. Thus, the government needs to actively study the innovative development of mobile media-related technologies that can promote mobile media, such as the development of mobile apps for emergency management, geographic location-based early warning systems, and cross-platform message push systems. This information will help to improve the efficiency and coverage of emergency information dissemination and ensure that information can be quickly delivered to the people who need it. The goal of media information dissemination is to mitigate hazards (Seeger, 2006), and it is hoped that the results of this study on public media behavior regarding early warning information about potential disasters will help government departments to better utilize information channels to communicate effectively with the public, so that the public will be able to take timely measures to prevent hazards before they occur.

Acknowledgments

Not applicable.

Authors contributions

Dr. Chen and Prof. Wang were responsible for study design and revising. Prof. Wang was responsible for data collection. Dr. Chen drafted the manuscript and Prof. Wang revised it. All authors read and approved the final manuscript, and contributed equally to the study.

Funding

This work was supported by Post-Doctor LAB employment support Program (INU SURE LAB Program) (2023) in the Incheon National University.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Redfame Publishing.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

Open access

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

References

- Ali, S. H., Foreman, J., Tozan, Y., Capasso, A., Jones, A. M., & DiClemente, R. J. (2020). Trends and predictors of COVID-19 information sources and their relationship with knowledge and beliefs related to the pandemic: nationwide cross-sectional study. *JMIR public health and surveillance*, 6(4), e21071. <https://doi.org/10.2196/21071>
- Austin, L., Fisher Liu, B., & Jin, Y. (2012). How audiences seek out crisis information: Exploring the social-mediated crisis communication model. *Journal of Applied Communication Research*, 40(2), 188-207. <https://doi.org/10.1080/00909882.2012.654498>
- Debahuti, C., & Tilak, G. (2020). Role of media during environmental crisis in India (With soecial reference to delhi smog). *Journal of Xi'an University of Architecture & Technology*, 7(2), 152-160.
- Dryhurst, S., Schneider, C. R., Kerr, J., Freeman, A. L., Recchia, G., Van Der Bles, A. M., & Van Der Linden, S. (2022). Risk perceptions of COVID-19 around the world. In *COVID-19* (pp. 162-174). Routledge.
- Health Impact Institute. (2020). *Health Impacts of PM2.5*. Retrieved from <https://www.stateofglobalair.org/health/pm#major-impacts>
- Hu, Z., & Tian, X. (2020). International communication of public emergencies in the new media era—taking reporting on the new coronavirus epidemic as an example. *External Communication*, 4, 7-9.
- Hyer, R. N., & Covello, V. T. (2007). *Effective media communication during public health emergencies: a WHO field guide*. World Health Organization.
- Johnson, B. B. (2012). Experience with urban air pollution in Paterson, New Jersey and implications for air pollution communication. *Risk Analysis: An International Journal*, 32(1), 39-53. <https://doi.org/10.1111/j.1539-6924.2011.01669.x>
- Kasperson, R. E. (2012). The social amplification of risk and low-level radiation. *Bulletin of the Atomic Scientists*, 68(3), 59-66. <https://doi.org/10.1177/0096340212444871>
- Kim, M., Yi, O., & Kim, H. (2012). The role of differences in individual and community attributes in perceived air quality. *Science of the Total Environment*, 425, 20-26. <https://doi.org/10.1016/j.scitotenv.2012.03.016>
- Li, W., Jiang, K., & Xiong, Y. (2020). People's most trusted source is still the official channel. *Online Communication*, 5, 89-92.
- Long, N. N., & Khoi, B. H. (2020). An empirical study about the intention to hoard food during COVID-19 pandemic. *Eurasia Journal of Mathematics, Science and Technology Education*, 16(7), em1857. <https://doi.org/10.29333/ejmste/8207>
- McCarthy, M., Brennan, M., De Boer, M., & Ritson, C. (2008). Media risk communication—what was said by whom and how was it interpreted. *Journal of Risk Research*, 11(3), 375-394. <https://doi.org/10.1080/13669870701566599>
- Mileti, D. S., & Fitzpatrick, C. (1992). The causal sequence of risk communication in the Parkfield earthquake prediction experiment. *Risk Analysis*, 12(3), 393-400. <https://doi.org/10.1111/j.1539-6924.1992.tb00691.x>
- Niu, J., Chen, C., Ning, L., Zhang, P., Bi, X., Wu, Q., & Hao, Y. (2020). Public satisfaction with risk communication under the new coronavirus epidemic: the influence of information needs, channel preference, media trust and emotion. *Science in China Funds*, 34(6), 794-803.
- Nunnally, J. C., & Bernstein, I. (1994). The assessment of reliability. *Psychometric theory*, 3(1), 248-292.
- Paek, H. J., & Hove, T. (2017). Risk perceptions and risk characteristics. In *Oxford Research Encyclopedia of*

- Communication*. <https://doi.org/10.1093/acrefore/9780190228613.013.283>
- Pearce, W., Niederer, S., Özkula, S. M., & Sánchez Querubín, N. (2019). The social media life of climate change: Platforms, publics, and future imaginaries. *Wiley interdisciplinary reviews: Climate Change*, 10(2), e569. <https://doi.org/10.1002/wcc.569>
- Seeger, M. W. (2006). Best practices in crisis communication: An expert panel process. *Journal of Applied Communication Research*, 34(3), 232-244. <https://doi.org/10.1080/00909880600769944>
- Sellnow, T. L., Ulmer, R. R., Seeger, M. W., & Littlefield, R. S. (2009). *Effective risk communication: A message centered approach*. New York, NY: Springer. <https://doi.org/10.1007/978-0-387-79727-4>
- Shapiro, M. A., & Bolsen, T. (2018). Transboundary air pollution in South Korea: An analysis of media frames and public attitudes and behavior. *East Asian Community Review*, 1, 107-126. <https://doi.org/10.1057/s42215-018-0009-1>
- Soroya, S. H., Farooq, A., Mahmood, K., Isoaho, J., & Zara, S. E. (2021). From information seeking to information avoidance: Understanding the health information behavior during a global health crisis. *Information Processing & Management*, 58(2), 102440. <https://doi.org/10.1016/j.ipm.2020.102440>
- Wahlberg, A. A., & Sjoberg, L. (2000). Risk perception and the media. *Journal of Risk Research*, 3(1), 31-50. <https://doi.org/10.1080/136698700376699>
- Wang, X. (2019). The influence path of public environmental risk perception on behavioral choices. *Journal of Jishou University (Social Science Edition)*, 40(4), 114.
- Wang, Y., Wild, O., Chen, H., Gao, M., Wu, Q., Qi, Y., & Wang, Z. (2020). Acute and chronic health impacts of PM2. 5 in China and the influence of interannual meteorological variability. *Atmospheric Environment*, 229, 117397. <https://doi.org/10.1016/j.atmosenv.2020.117397>
- Wu, Z., Kim, J., & An, B. (2023). A Comparative Analysis of Public Warning Systems by Countries to Improve Public Warning System. *The Journal of Information Systems*, 32(3), 183-203.
- Xing, Y. F., Xu, Y. H., Shi, M. H., & Lian, Y. X. (2016). The impact of PM2. 5 on the human respiratory system. *Journal of Thoracic Disease*, 8(1), E69-E74.
- Zeng, F., Dai, J., & Wang, Y. (2015). Technical risk VS perceived risk: Communication process and social amplification of risk. *Modern Communication: Journal of Communication University of China*, 3, 40-46.
- Zhang H., Liang S., & Wang J. (2020). Official channels, interpersonal communication, we media: analysis of the credibility of communication channels about the new coronavirus epidemic. *Journalism and Writing*, 4, 37-42.
- Zhang, Y., Wei, J., & Qi, W. (2012). Research on channel preferences for public information acquisition under emergencies. *Information Science*, 30(4), 574-578.
- Zhuang, L., He, J., Yong, Z., Deng, X., & Xu, D. (2020). Disaster information acquisition by residents of China's earthquake-stricken areas. *International Journal of Disaster Risk Reduction*, 51, 101908. <https://doi.org/10.1016/j.ijdrr.2020.101908>