



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Contents lists available at ScienceDirect

Urban Governance

journal homepage: www.elsevier.com/locate/ugj

Health communication and trust in institutions during the COVID-19 lockdown in China's urban communities

Fan Yang^{a,b,*}, Zili Huang^a^a School of International and Public Affairs, Shanghai Jiao Tong University, China^b China Institute for Urban Governance, Shanghai Jiao Tong University; Institute of Health Yangtze River Delta, Shanghai Jiao Tong University, Room 335, Xinjian building, 1954 Huashan Road, Shanghai 200030, China

ARTICLE INFO

Keywords:

Health communication
Trust in institutions
Resilient urban governance
COVID-19 pandemic
Social media

ABSTRACT

Communicating health knowledge effectively at the community level is essential for shaping resilient urban governance in a pandemic period. This paper examines how three styles of community health communication, namely traditional authoritative communication (TAC), authoritative communication via social media (ACSM), and interactive communication via social media (ICSM), were associated with public trust in different types of “institutions”, namely the community administration and scientists, in a context where the respondents were in strict lockdown. This research was conducted with an online survey in February 2020 of 4595 respondents in urban China not long after the strict lockdown was introduced. Embedded in the theory of public trust in institutions during pandemic, the regressions established that traditional authoritative communication played a significant role in maintaining the public's trust in both community administrators and scientists. Interactive communication via social media damaged trust in scientists and increased trust in administrators when used effectively. It is suggested that policymakers, government officials, and healthcare professionals should not abandon traditional authoritative health communication, and greater efforts can be devoted to quality improvement. Moreover, the study highlighted the need to gain a better understanding of what the targeted audience perceive to be “good communication” before communication.

1. Introduction

Communicating health knowledge at the community level is a part of urban governance that is essential for shaping resilience during a pandemic. Effective health communication plays a vital role in maintaining community health in regular times (Bursztyl et al., 2020) and is even more crucial to pandemic control through enhancing risk awareness and trust in institutions (Lopez et al., 2020). The term institution refers to a structure that provides social cooperation and order through governing the behaviors of individuals living in a certain locality, or a society (Helsley & Strange, 2000; Nooteboom, 2007). Its major types include political institutions (e.g. political leadership and governments at different levels) and social institutions (e.g. news media and scientific community). Trust in institutions reflects the security one feels about with the presence of an institution, such as social safety nets when one may lose the ability to earn income, and the belief that things would be in handled properly (McKnight et al., 1998). It may be about the belief

that the institutions would provide reliable information, make suitable decisions or would operate effectively.

Trust in institutions could be a pillar of effective public health crisis management. Ideally, in a pandemic, when people trust governments, especially community administration and health professionals like scientists, they would follow the official instructions and the pandemic can be controlled as planned (Legido-Quigley et al., 2020). However, the reality is far from ideal. In many countries, scientists are not always trusted by politicians or the general public (Maher et al., 2020). During the pandemic, the public service providers are also faced with mistrust from the public (Yashadhana et al., 2020). Low trust in these institutions may result in non-compliance, leading to increased infection and higher death rates (Erceg et al., 2020). To tackle the problem, we should not only rely on government actions and medical professionals, but also explore ways of maintaining social resilience, such as utilizing proper health communication at the community level (Ataguba & Ataguba, 2020). In the context of China, explorations in this aspect could generate new

* Corresponding author.

E-mail addresses: fan_yang86@sjtu.edu.cn (F. Yang), zili.hwang@outlook.com (Z. Huang).<https://doi.org/10.1016/j.ugj.2021.10.001>

Received 13 April 2021; Received in revised form 3 October 2021; Accepted 4 October 2021

Available online 9 November 2021

2664-3286/© 2021 The Author(s). Published by Elsevier B.V. on behalf of Shanghai Jiao Tong University. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

knowledge and best practice about managing health crisis in large urban areas.

2. Strategies of COVID-19 communication in China

In China, from 23 January 2020 to mid-March, people in most cities stayed indoors because of the lockdown. In the residential estates that suffered from community infections, the whole complex would be cordoned off and food and necessities were delivered to the community. In the estates that did not have confirmed cases, each household received a quota for shopping trips each week. The number of days were different as cities decided their own policies (Li et al., 2020). Trust in the government leadership was low to begin with because of the public outcry against the treatment of Dr. Wenliang Li and his colleagues, and the initial slow response by the government (Enos, 2020). The low trust caused panic which resulted in hospital run, rampant rumor and panic escapes from Wuhan. Even though the government was gathering its act together in late January, the panic was still strong by the end of the month (Qiu et al., 2020). People was very anxious and depressed and rumors spread fast which caused more anxiety (Li et al., 2020; Yang, 2021).

If the trust remained to be low, the level of panic would also grow. Therefore, it is urgent to improve communication which is expected to restore social order, enhance public trust and resilience. Once the governments realized the problems of not having trusted sources of information, teams of experts were organized to distribute information to the public. Members of the National Novel Coronavirus Pneumonia Expert Group and professionals long engaged in disease prevention and epidemiology co-authored “110 Questions on the Novel Coronavirus” (Ma et al., 2020), which became a popular brochure during the epidemic. Medical experts from more than ten departments of Peking Union Medical College Hospital (PUMCH, one of the most famous hospitals in China), compiled Q&As on self-protection suggestions for public (Sun et al., 2020). The brochure, government policies, health knowledges were disseminated through media platforms, including mainstream media and social media platforms, and within residential communities using conventional and new methods, such as brochures and banners, social media posts, and social media discussion groups.

Different types of communication were employed to communicate the state of the pandemic, scientific knowledge of the virus, means of self-protection and response strategies and activities. The methods included using conventional media such as TV, Newspapers, street banners and community billboards and posters, and new media such as QQ, WeChat and Weibo. Almost all urban communities set up WeChat groups. In these groups, information is distributed using a top-down style. Another type of WeChat group is self-organized or “private,” and its members are friends, neighbors, family members, alumni, or people with common interests. In these groups, any member can distribute information, and people interact with each other frequently. Peers shape the circulation of information in these groups.

3. Communication and trust in institutions in a pandemic

Trust in institutions can be affected by various factors. It can be partially affected by the trust in the (often human) agents that represents the institution or people’s trust of each other (Sønderskov & Dinesen, 2016), or by the track record of the institutions (Grosskopf, 2008). Both of these can be improved through effective communication. For different types of institutions, trust can have different meanings. Laurent (2018) argued that ‘trusting institutions’ oscillates between institutional confidence and mere reliance, depending on the social function of the institution at hand. In the context of China, due to the administratorization of academia (Bodenhorn, 2020) and the administrator absorption of society (Kang & Han, 2007), the public may perceive both scientific institution and community administrative institution are

closely related with government and thus their trust in these institutions could be affected by mode of health communication in a similar way.

A systematic review done by Chryssochoidis et al. (2009) suggests that trust in institutions in the context of risk management can be affected by four factors: (1) the (perception of) the characteristics of the information received; (2) the (perception of) the risk managed or communicated; (3) the (perception of) institutional characteristics; (4) the individual and socio-cultural characteristics of those who exhibit trust. This can be a useful framework for examining the association between health communication and trust in institutions. Echoing this audience perspective, a number of factors related with health communication have been highlighted to have influenced people’s acceptance of the knowledge shared by scientific and administrative institutions (Ihlen, 2020). The first one could be the type of media used in health communication. The Internet and social media bore high hope for more effective communications than traditional media (e.g. brochure, banner, and broadcasting) early on as they are easier to reach out. However, the effectiveness is not universal. Since the beginning of the COVID-19 pandemic, many scholars have published analyses on the impact of media, social media in particular, on misinformation in many countries. Twitter and Facebook are magnifying the negative impact of social media by demonstrating how efficiently misinformation can be distributed (Depoux et al., 2020) and how messaging can intensify the public’s emotions (Rosenberg et al., 2020). Digital social media have also been used to combat misinformation (Brindha et al., 2020; Gonçalves-Sá, 2020); for instance, government agencies and social service providers, junior medical and health professionals, and concerned citizens using crowdsourcing have taken the initiative to do so (Quadri et al., 2020). On the whole, while having deficits, social media could be an appropriate and useful tool to shape the public’s trust in institutions. Therefore, we propose the following research hypothesis:

H1: Using social media to communicate is associated with higher trust in community administrative institution and scientific institution than using traditional media.

Secondly, the direction of health communication also matters. Interactive communication or a bottom-up approach may be more effective in helping people better understand the necessary behavioral changes (Fotheringham et al., 2000). However, a bottom-up approach requires competent communicators, otherwise it may result in lower trust (Wilson & Irvine, 2013). On the other hand, past literature uncovers the limitations of a top-down approach to health communication, including can hardly amount to social mobilization, failing to advance pre-established health goals, and high costs (Obregón & Waisbord, 2010; Huber et al., 2012; Durrance-Bagale et al., 2020). Therefore, we propose the following research hypothesis:

H2: Interactive communication of health information is associated with higher trust in community administrative institution and scientific institution than the top-down communication.

Thirdly, past literature also reveals the importance of the perceived quality of health communication. The perceived quality of communication is a complex indicator which combines the perception of the nature of risks and the perception of the information received. This assumes that people would consider information that is suitable for the events (risks) concerned to be better quality than those not. Kreuter and Wray (2003) argued that when communication programs and materials are relevant to the intended audience, they are more effective than those that are unspecific. Better tailoring, such as using more accessible language for people with lower literacy levels, makes messages more effective (Plimpton & Root, 1994; Scrimshaw et al., 2002). Similar to traditional media, tailored messages have appeared to be more effective than generic messaging (Bennett & Glasgow, 2009). Therefore, we propose the following research hypothesis:

H3: Perceived quality of health communication is positively associated with trust in community administrative institution and scientific institution.

4. The present study

The present study examines the case of China which has the most stringent lockdown at the peak of its COVID-19 outbreak. China is a particularly useful case as it has the most stringent lockdown that other countries did not introduce. Despite that there are doubts over whether it should have introduced such “draconian” lockdowns, the actual implementation of the lockdown provides a rare opportunity for us to examine its impact.

In China, the focus of research attention has been on the role of the national and municipal government and the medical professions (Scrimshaw et al., 2002; Bennett & Glasgow, 2009; O'Hara et al., 2020; Roller-Wirnsberger et al., 2020). What's happening beyond the front-line of the pandemic treatment and government policy strategies are not well researched apart from anecdotal records. This study focuses on urban people's trust of chief scientists and the community administration, the two sets of institutions that are closely related with resilience in governance. They are about people working on informing, encouraging and conducting supporting services to make it less likely for the public to rely on hospital treatment.

This paper fills the research gap by examining how the means of health communication in China's urban communities were associated with the trust of community-level administrative bodies and the chief scientists during the strict lockdown period in the COVID-19 pandemic. The findings may provide important insights into the combined effects of means of communicating health knowledge and perceived quality of communication on the trust in institutions in the context of risk management.

5. Methodology

Participants and procedures

The data for this research was collected from 22 February to 29 February, 2020, when the COVID-19 pandemic was at its peak in China, and the strictest social distancing rules were applied nationwide. From all 34 provincial-level administrative regions in China, 4595 urban netizens participated in the questionnaire survey. The eligibility criteria included that the participant: 1) was 16 years old or older; 2) provided informed consent, and 3) was living in a urban community in China.

A professional online survey platform was used to deliver the electronic questionnaire. The platform generated a web link and quick response (QR) code for the questionnaire, and research assistants posted the link and code on the bulletin board system (BBS) of the gateway website of each Chinese province. Using the link or code, the participants accessed the questionnaire and answered the questions anonymously. We also asked the initial participants to pass on the questionnaire through their social networks. Those who submitted responses successfully received a cash coupon for symbolic gifts. Electronic informed consent was obtained from the participants before each respondent began answering the questions. Research ethics approval was obtained from the Ethics Committee for Scientific Research of the corresponding author's university.

Statistical models. Two multivariable regression models are developed to examine the factors that are related to people's trust in two types of institutions, namely the administrative institution in community and scientific institution.

Dependent variables. The dependent variables for the two models were the respondents' self-reported ratings of trust in local officials in charge of their village/residential communities and their trust in the chief scientists of China's COVID-19 pandemic task force. The responses were rated on an 11-item Likert scale that ranged from 0 to 10, with a higher score indicating a higher level of trust.

Independent variables. We set the independent variables as communication styles at the community level. Three styles were identified: traditional authoritative communication (TAC), authoritative communica-

tion using social media (ACSM), and interactive communication using social media (ICSM). TAC refers to communicating through banners, posters, brochures, and broadcast, which are unidirectional and top-down. ACSM is top-down, but the information is delivered through the Internet and social media. For example, it is posted on the homepage of websites and social media public accounts. ICSM refers to the sharing of COVID-19-related information in social media groups, in which community residents could participate.

We required the participants to answer whether their communities adopted TAC, ACSM, or ICSM. The respondents were also asked to rank how well each communication style performed in the community. The responses included the following options: the community was “without it or don't know”; “had it, but it did not function well”; or “had it, and it functioned well.” For the regression analyses, two dummy variables for each style of communication were used: 1) “had it, but it did not function well” = 1, “other” = 0; and 2) “had it, and it functioned well” = 1, “other” = 0. We made the participants who reported “without it or don't know” the reference group when examining each style of communication.

Controlled variables. This study controlled for participants' demographic variables, including gender (male = 0, female = 1), age (in years), education (4 levels from “elementary school or below” = 1 to “university/college or above” = 4), current location (“non-Hubei Province residents” = 0, “Hubei Province residents” = 1), and the socioeconomic status of current residential neighborhood relative to the prefecture (ranging from 1 to 5, with 1 being “very low” and 5 being “very high”). Trust in institutions can be closely associated with one's partisanship, especially in an authoritarian regime such as that in China (Chen, 2017). Thus, we controlled for membership in the Chinese Communist Party (CCP; non-CCP member = 0, CCP member = 1). Vast internal migration is a major characteristic of the Chinese population, and China was estimated to have over 290 million rural-to-urban migrants by the end of 2019 (National Bureau of Statistics of China 2020). The literature shows that internal migrants may differ from locals in terms of trust in institutions (Niu and Zhao, 2018). Therefore, we included identity as a migrant as a covariate, coding domestic migrant = 1 and non-migrant = 0.

6. Results

6.1. Descriptive statistics

Table 1 reports the descriptive statistics of the research variables. The 4,595 participants had an average age of 32.29 years (SD = 11.63), and 59.3% of them were women. Of them, 44.5% had a yearly income lower than CNY30,000, and 91.3% had received a high school education or above. Moreover, 30.9% were members of the Chinese Communist Party, 26.1% were domestic migrants, 15.9% were currently living in Hubei Province (then epicenter of Covid-19 pandemic in China), and 38.9% rated the relative socioeconomic status of their current residential neighborhood as high or above. Concerning the communication styles, 89.2%, 81.3%, and 68.1% of the participants reported that their communities had adopted TAC, ACSM, and ICSM, respectively.

6.2. Multivariate regression results

We first tested the relationship between communication style, quality, and trust in administrative institutions. Table 2 shows the results of the multivariate regression for trust in community administrative institutions.

Compared with participants who did not receive TAC, those with well-functioning TAC showed significantly more trust in community administrative institutions ($\beta = .14, p < .001$). However, those with low-quality TAC showed a significantly lower level of trust in administrative institutions than those who did not receive TAC ($\beta = -.08, p < .01$).

Table 1
Descriptive statistics for the research variables (N = 4595).

	Total participants M (SD) / N (%)
Female	2,727 (59.3%)
Age (16-85 years)	32.29 (11.63)
Education	
University/college or above	3,516 (76.5%)
High school or equivalent	681 (14.8%)
Junior high school	351 (7.6%)
Elementary school or lower	47 (1.0%)
CCP member	1,421 (30.9%)
Domestic migrant	1,198 (26.1%)
Current location	
Residents in Hubei Province	732 (15.9%)
Others	3863 (84.1%)
Neighborhood SES	
Very high	466 (10.1%)
High	1,323 (28.8%)
Ordinary	2,339 (50.9%)
Low	385 (8.4%)
Very low	82 (1.8%)
Traditional authoritative communication	
Had it, and it functioned well	2,997 (65.2%)
Had it, but it did not function well	1,104 (24.0%)
Without it, or don't know	494 (10.8%)
Authoritative communication using social media	
Had it, and it functioned well	2,775 (60.4%)
Had it, but it did not function well	959 (20.9%)
Without it, or don't know	861 (18.7%)
Interactive communication using social media	
Had it, and it functioned well	2,237 (48.7%)
Had it, but it did not function well	893 (19.4%)
Without it, or don't know	1,465 (31.9%)
Trust in scientific authority (0-10)	8.48 (1.93)
Trust in administrative authority (0-10)	6.71 (2.46)

Table 2
Multivariate regression results: trust in administrative institution (N = 4595).

Variable	Model 1	Model 2
Gender (ref: male)	.06***	.04**
Age	-.05**	-.06***
Education	-.16***	-.14***
CCP membership (ref: non-CCP member)	.05**	.04**
Domestic migrant (ref: non-migrant)	-.02	-.02
Current location (ref: Hubei residents)	-.03*	-.04*
Neighborhood SES	-.04*	-.03*
TAC (ref: without TAC)		
Had it, but it did not function well		-.08**
Had it, and it functioned well		.14***
ACSM (ref: without ACSM)		
Had it, but it did not function well		.01
Had it, and it functioned well		.08***
ICSM (ref: without ICSM)		
Had it, but it did not function well		.01
Had it, and it functioned well		.12***
R square	.025	.124
Adjusted R square	.023	.121
F change	16.67***	50.37***

Note: SES = socioeconomic status; TAC = traditional authoritative communication; ACSM = authoritative communication using social media; ICSM = interactive communication using social media;
* $p < .05$,
** $p < .01$,
*** $p < .001$.

Table 3
Multivariate regression results: trust in scientific institution (N = 4595).

Variables	Model 1	Model 2
Gender (ref: male)	.15***	.14***
Age	.06***	.05***
Education	-.02	-.02
CCP membership (ref: non-CCP member)	.04*	.04*
Domestic migrant (ref: non-migrant)	-.02	-.02
Current location (ref: Hubei residents)	.01	.02
Neighborhood SES	.04*	.04*
TAC (ref: without TAC)		
Had it, but it did not function well		.04
Had it, and it functioned well		.10***
ACSM (ref: without ACSM)		
Had it, but it did not function well		-.08***
Had it, and it functioned well		.03
ICSM (ref: without ICSM)		
Had it, but it did not function well		-.08***
Had it, and it functioned well		-.06**
R square	.029	.053
Adjusted R square	.027	.051
F change	19.44***	20.01***

Note: SES = socioeconomic status; TAC = traditional authoritative communication; ACSM = authoritative communication using social media; ICSM = interactive communication using social media;
* $p < .05$,
** $p < .01$,
*** $p < .001$.

Compared with participants who did not receive authoritative governmental health communication through social media (ACSM), those who received ACSM of good quality had significantly enhanced trust ($\beta = .08, p < .001$), while those with low-quality ACSM showed less trust in institutions ($\beta = .01$). However, the difference was not statistically significant ($p = .64$). Compared with participants who did not use social media to share information interactively (ICSM), those who experienced well-functioning ICSM had significantly higher trust ($\beta = .12, p < .001$). Trust in administrative institutions for those in communities with low-quality ICSM was indifferent ($\beta = .01$). However, the result was not statistically significant ($p = .90$).

These findings partially support the hypotheses: good-quality communication, regardless of the style of communication, was better than no communication at all; and low-quality communication, especially in the TAC style, was damaging to trust in community administrative institutions.

The second test concerned the association between communication style and quality combined and trust in scientific institutions. Table 3 shows the results of the regression.

The participants living in urban communities without TAC reported lower trust in scientific institutions than those with TAC of good quality significantly ($\beta = .10, p < .001$) and those with TAC of poor quality insignificantly ($\beta = .04, p = .14$). Compared with participants who did not use ACSM, those who experienced ACSM of poor quality reported significantly lower trust ($\beta = -.08, p < .001$). Those in communities with ACSM of good quality reported a positive impact ($\beta = .03$), but the result was statistically insignificant ($p = .23$). Compared with participants who did not use ICSM, ICSM of poor quality resulted in a lower level of trust than it did for participants who experienced ICSM of good quality.

Therefore, the hypotheses were supported only by the results for the TAC style. Receiving health communication through social media may carry the risk of undermining trust in scientific institutions. This risk was especially problematic when interactive communication via social media was done poorly.

7. Discussion and conclusion

Trust in administrative and scientific institutions is closely related with the public's compliance to health crisis control measures, which could be a pillar of urban governance in the period of COVID-19 pandemic. In the context of the still haunting pandemic, adopting proper health communication strategies at the community level can shape resilient urban governance through influencing people's trust in institutions. Based on an online survey of 4,595 urban netizens in China during the strict lockdown period, the present study reveals how different types of media used to communicate, direction of health communication, and perceived quality of communication were associated with the public's trust in administrative and scientific institutions.

When the socioeconomic indicators were controlled, the relationship between the style (i.e., TAC, ACSM, and ICSM) and perceived quality of health communication and trust in institutions was different for the two types of institutions. This finding echoes the summaries made by Chrysochoidis et al. (Bodenhorn, 2020). Overall, perceived low-quality communication, regardless of style, did not enhance trust. It may have damaged trust. Any good-quality communication enhanced trust in administrative institutions. TAC played a significant role in the pandemic, even in this digital age. It was also associated with the higher trust in scientific institutions in our sample. This relationship was especially strong for the older people in our sample. High-quality traditional means of communication resulted in higher levels of trust in scientific institutions, and older people had greater trust in scientific institutions. These findings together demonstrated that traditional communication can work for older population. This could be related to the fact that China has experienced dramatic social and economic changes in the past 40 years. The older generation grew up in an era whose public communication style was aggressively top-down. The younger generation is much more accustomed to modern and Western styles of communication (Chen, 2016). The older generation may expect old-fashioned communication to appear in the street (banners, posters, billboards) and on television when it was in emergency. These findings highlight that even in China, where the vast majority of people use digital media, traditional forms of communication still matter. It is also interesting to find that residents in Hubei Province, China's epicenter of the COVID-19 pandemic during the national lockdown period, reported significantly higher trust in community administrative institution. This may be due to the vast and effective political mobilization in grassroots governments of this province at that time.

The research findings also confirm the existing recognition of the need for interactive communication (Depoux et al., 2020). However, unless the interactive communication on social media is well-received by the users, it can undercut trust in institutions. According to Vaughan and Tinker (2009), health communications in a pandemic must instruct, inform, and motivate self-protective behavior; update risk information; develop trust in officials/institutions; and dispel rumors. However, the COVID-19 pandemic took place in the digital era, when new media, especially social media, have brought in both opportunities and challenges in the distribution of health information. Even though there had been high hope of using social media to communicate effectively, the recent studies which cover the up-to-date social media with the new generation of users continue to support that digital social media is far from an effective means of communication during a pandemic (Vraga & Bode, 2018). This study echoes this by revealing that ICSM was negatively associated with trust in scientists and health professionals regardless the perceived quality of health communication. Past literature shows that when exposed to complex sources of information, people are less likely to make accurate judgements on the liability of the information in a short period of time, thereby decreasing their trust in institutions (Moorhead et al., 2013).

Countries or local governments have different responding strategies towards the pandemic and people's ability to travel out of their homes have been restricted. There is an urgent need to enhance public

trust in institutions in order to implement the strategies. Because of the need for social distancing, some conventional means to enhance public trust, such as face-to-face outreach meetings, become difficult to operate (Yang, 2006, Warren et al., 2014). These issues put severe constraints to what methods the institutions can make use of to improve trust. To a certain extent, the higher the level of constraints, the more limited instruments one can have to enhance trust. However, from the perspective of research, the less instruments means the analyses may become less complicated as there would be less contributing factors. In this sense, COVID-19 provides unprecedented opportunities to analyze public trust in institutions and the contributing factors to it in different contexts of lockdowns.

The findings from this study should be interpreted with the following caveats. First, selection bias in participants' perceptions might exist due to the cross-sectional design of this study. That is, participants who had low level of trust in administrative and scientific institutions might be more likely to perceive the information they receive from the two institutions to be low in quality. Second, this study was based on an online survey of Chinese urban netizens. Although it had a nationwide scale and a large sample size, it was based on voluntary participation and snowballing. It should be noted that the majority of the participants had university degree and they had varied exposure to the pandemic risks due to their different residence location. Therefore, the views are those of the respondents alone. One should be cautious not to draw conclusions about the whole Chinese population from the findings. Having said so, the findings regarding the importance of traditional media may still be underestimated considering that people who took the survey would be those who have good literacy about the Internet and social media. Further studies of people with poorer access to digital media would be useful. Finally, it is noted that the effect sizes for the health communication styles were relatively small, although many of them were statistically significant. This might be explained by the participants' relatively low variation in the trust of administrative and scientific institutions. In fact, the participants generally had high trust in both institutions, considering it was measured using a 10-point Likert scale.

This research has policy implications for resilient urban governance. Local communities in urban China increasingly rely on digital social media for governance (Rongzhuo & Dandan, 2015, Arcuri & Jing, 2019). It is considered more efficient and less labor-intensive. However, given the importance of high-quality authoritative traditional communication, community institutions may need to consider maintaining the traditional methods. More efforts should be devoted to improving the quality of communication. Instead of waiting for the government to generate quality standards, community leaders and health professionals should consider consulting with the target audience about what would be a good way to communicate with them.

Declaration of Competing Interest

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.

Acknowledgement

Special thanks to Professor Bingqin Li on her kind supports in designing the research.

References

- Arcuri, G., & Jing, C. (2019). The paradigm shifts of community governance in China. *Baltic Journal of Real Estate Economics and Construction Management*, 7, 30–59.
- Ataguba, O. A., & Ataguba, J. E. (2020). Social determinants of health: the role of effective communication in the COVID-19 pandemic in developing countries. *Global Health Action*, 13, Article 1788263.
- Bennett, G. G., & Glasgow, R. E. (2009). The delivery of public health interventions via the Internet: Actualizing their potential. *Annual Review of Public Health*, 30, 273–292.

- Bodenhorn, T. (2020). Management and “administerization” in China’s higher education system: A review from the trenches. *The China Quarterly*, 244, 969–987.
- M.D. Brindha, R. Jayaseelan, and S. Kadeswara, Social media reigned by information or misinformation about COVID-19: A phenomenological study. (2020)
- Bursztyn, L., Rao, A., Roth, C., & Yanagizawa-Drott, D. (2020). *Misinformation during a pandemic*. University of Chicago, Becker Friedman Institute for Economics Working Paper.
- Chen, D. (2017). Local distrust and regime support: Sources and effects of political trust in China. *Political Research Quarterly*, 70, 314–326.
- Chen, X. (2016). *Staging Chinese revolution: Theater, film, and the afterlives of propaganda*. Columbia University Press.
- Chrysochooidis, G., Strada, A., & Krystallis, A. (2009). Public trust in institutions and information sources regarding risk management and communication: Towards integrating extant knowledge. *Journal of Risk Research*, 12, 137–185.
- Depoux, A., Martin, S., Karafillakis, E., Preet, R., Wilder-Smith, A., & Larson, H. (2020). *The pandemic of social media panic travels faster than the COVID-19 outbreak*. Oxford University Press.
- Durrance-Bagale, A., Han, E. K. L., Hock, S. S., Lazo Porras, M., Frumence, G., & McKee, M. (2020). Health research and health service delivery after COVID-19: Moving from top-down to people-centred approaches. *BMJ*.
- Enos, O. (2020). *How the chinese government undermined the Chinese people’s attempts to prevent and respond to COVID-19*. Heritage Foundation.
- N. Erceg, M. Ružojčić, and Z. Galic, Misbehaving in the corona crisis: The role of anxiety and unfounded beliefs. (2020)
- Fotheringham, M. J., Owies, D., Leslie, E., & Owen, N. (2000). Interactive health communication in preventive medicine: Internet-based strategies in teaching and research. *American Journal of Preventive Medicine*, 19, 113–120.
- Gonçalves-Sá, J. (2020). In the fight against the new coronavirus outbreak, we must also struggle with human bias. *Nature Medicine*, 26, 305–305.
- Grosskopf, A. (2008). Explaining the democratic trust conundrum: The sources of institutional trust in the reunited Germany. *International Social Science Review*, 83, 3–26.
- Helsley, R. W., & Strange, W. C. (2000). Social interactions and the institutions of local government. *American Economic Review*, 90, 1477–1490.
- Huber, J. T., Shapiro, R. M., & Gillaspay, M. L. (2012). Top down versus bottom up: The social construction of the health literacy movement. *The Library Quarterly*, 82, 429–451.
- Ihlen, Ø. (2020). Science communication, strategic communication and rhetoric: The case of health authorities, vaccine hesitancy, trust and credibility. *Journal of Communication Management*.
- Kang, X., & Han, H. (2007). Administrative absorption of society: A further probe into the state-society relationship in Chinese Mainland. *Social Sciences in China*, 02, 116–128.
- Kreuter, M. W., & Wray, R. J. (2003). Tailored and targeted health communication: Strategies for enhancing information relevance. *American Journal of Health Behavior*, 27, S227–S232.
- Lauret, P. (2018). Why (and how to) trust Institutions? Hospitals, schools, and liberal trust. *Rivista di estetica*, 41–68.
- Legido-Quigley, H., Asgari, N., Teo, Y. Y., Leung, G. M., Oshitani, H., Fukuda, K., et al. (2020). Are high-performing health systems resilient against the COVID-19 epidemic? *The Lancet*, 395, 848–850.
- Li, B., Chen, X., & Gong, S. (2020). *Proactive and coordinated response to COVID-19: Comparing the experience of China, South Korea and Singapore during the first 100 days* (p. 19). China: CIKD.
- Li, W., Yang, Y., Liu, Z.-H., Zhao, Y.-J., Zhang, Q., & Zhang, L. (2020). Progression of mental health services during the COVID-19 outbreak in China. *International journal of biological sciences*, 16, 17–32.
- C.E. Lopez, M. Vasu, and C. Gallemore, Understanding the perception of COVID-19 policies by mining a multilanguage Twitter dataset. arXiv preprint arXiv:2003.10359 (2020)
- Ma, X.-L., Chen, Z., Zhu, J.-J., Shen, X.-X., Wu, M.-Y., & Shi, L.-P. (2020). Management strategies of neonatal jaundice during the coronavirus disease 2019 outbreak. *World Journal of Pediatrics*, 1–4.
- Maher, P. J., MacCarron, P., & Quayle, M. (2020). Mapping public health responses with attitude networks: The emergence of opinion-based groups in the UK’s early COVID-19 response phase. *British Journal of Social Psychology*, 59, 641–652.
- McKnight, D. H., Cummings, L. L., & Chervany, N. L. (1998). Initial trust formation in new organizational relationships. *Academy of Management review*, 23, 473–490.
- Moorhead, S. A., Hazlett, D. E., Harrison, L., Carroll, J. K., Irwin, A., & Hoving, C. (2013). A new dimension of health care: Systematic review of the uses, benefits, and limitations of social media for health communication. *Journal of Medical Internet Research*, 15, e1933.
- National Bureau of Statistics of China, 2019 Monitoring and investigation report on rural migrant workers, Beijing, 2020.
- Niu, G., & Zhao, G. (2018). Identity and trust in government: A comparison of locals and migrants in urban China. *Cities*, 83, 54–60.
- Nooteboom, B. (2007). Social capital, institutions and trust. *Review of Social Economy*, 65, 29–53.
- Obregón, R., & Waisbord, S. (2010). The complexity of social mobilization in health communication: Top-down and bottom-up experiences in polio eradication. *Journal of Health Communication*, 15, 25–47.
- O’Hara, L., Rahim, H. F. A., & Shi, Z. (2020). Gender and trust in government modify the association between mental health and stringency of social distancing related public health measures to reduce COVID-19: A global online survey. *medRxiv*.
- Plimpton, S., & Root, J. (1994). Materials and strategies that work in low literacy health communication. *Public Health Reports*, 109, 86.
- Qiu, J., Shen, B., Zhao, M., Wang, Z., Xie, B., & Xu, Y. (2020). A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: Implications and policy recommendations. *General Psychiatry*, 33.
- Quadri, N. S., Thielen, B. K., Erayil, S. E., Gulleen, E. A., & Krohn, K. (2020). Deploying medical students to combat misinformation during the COVID-19 pandemic. *Academic pediatrics*.
- R. Roller-Wirnsberger, S. Lindner, L. Kolosovski, E. Platzer, P. Dovjak, H. Flick et al., The role of health determinants in the influenza vaccination uptake among older adults (65+): a scope review. (2020)
- Rongzhuo, C., & Dandan, X. (2015). From grid management to network governance—The practice, development and trend of urban community grid management. *Socialism Studies*, 04.
- Rosenberg, H., Syed, S., & Rezaie, S. (2020). The Twitter pandemic: The critical role of Twitter in the dissemination of medical information and misinformation during the COVID-19 pandemic. *Canadian Journal of Emergency Medicine*, 1–4.
- Scrimshaw, S., Bandura, A., & Fishbein, M. (2002). *Speaking of health: Assessing health communication strategies for diverse populations*. Washington, DC: Institute of Medicine.
- Sønderskov, K. M., & Dinesen, P. T. (2016). Trusting the state, trusting each other? The effect of institutional trust on social trust. *Political Behavior*, 38, 179–202.
- Sun, F., Zhang, G., & Chai, W. (2020). What can people do to prevent themselves from Coronavirus? *Here comes the recipe from the PUMCH* Beijing: Beijing Daily.
- Vaughan, E., & Tinker, T. (2009). Effective health risk communication about pandemic influenza for vulnerable populations. *American Journal of Public Health*, 99, S324–S332.
- Vraga, E. K., & Bode, L. (2018). I do not believe you: How providing a source corrects health misperceptions across social media platforms. *Information, Communication & Society*, 21, 1337–1353.
- Warren, A. M., Sulaiman, A., & Jaafar, N. I. (2014). Social media effects on fostering online civic engagement and building citizen trust and trust in institutions. *Government Information Quarterly*, 31, 291–301.
- Wilson, C., & Irvine, K. N. (2013). Bottom-up communication: identifying opportunities and limitations through an exploratory field-based evaluation. *Energy Efficiency*, 6, 91–104.
- Yang, F. (2021). Coping strategies, cyberbullying behaviors, and depression among Chinese netizens during the COVID-19 pandemic: a web-based nationwide survey. *Journal of Affective Disorders*, 281, 138–144.
- Yang, K. (2006). Trust and citizen involvement decisions: Trust in citizens, trust in institutions, and propensity to trust. *Administration & Society*, 38, 573–595.
- Yashadhana, A., Pollard-Wharton, N., Zwi, A. B., & Biles, B. (2020). *Indigenous Australians at increased risk of COVID-19 due to existing health and socioeconomic inequities*. The Lancet Regional Health—Western Pacific.