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ORIGINAL RESEARCH

The Effects of Information-Seeking Behaviors on Risk Perception During the COVID-19 Pandemic: A Cross-Sectional Correlational Survey

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Background: The COVID-19 pandemic caused by the novel SARS-CoV-2 virus represents an ongoing public health challenge that necessitates a heightened need to understand people's risk perceptions as well as their information-seeking behavior.

Objective: The aim of this study is to explore the impact of different information-seeking behaviors on people's risk perceptions during the COVID-19 pandemic.

Methods: We employed convenience sampling in order to administer questionnaires to 3048 residents in Hunan Province, China. After screening the questionnaires for inclusion in the study, multiple linear regressions were then used to analyze the impact of the characteristics of respondents' information-seeking behavior on their risk perceptions.

Results: From the 3048 distributed 2611 were included. New media (80.20%) was the most frequently used source of information seeking, and traditional media were participants' most trusted source of COVID-19 information. Statistics of COVID-19 were the type of information most frequently queried by respondents, and approximately 30.0% of them reported that most or all of the COVID-19 information they sought was negative. Approximately one in five respondents reported that they sought COVID-19 information more than 10 times per day. The results of our multivariate linear regression analysis showed that "seeking information from new media ", "level of trust in new media and local propaganda", "information content being about protective behaviors and personal related information", "proportion of negative information", and "frequency of information seeking" were positively associated, and "seeking information from traditional media" and "level of trust in traditional media" were negatively associated with people's risk perception of COVID-19.

Conclusion: We find that specific types of channels of information acquisition and public trust in these information channels, their informational content, and proportion of negative information, as well as a frequency of information seeking all had an impact on risk perception during COVID-19.

Keywords: information seeking behavior, risk perception, COVID-19

Introduction

At the end of 2019, China witnessed an outbreak of a novel coronavirus SARS-CoV-2 (COVID-19), and as of the spring of 2022 over 200 countries are still dealing with the disease.[1,2] In March, 2020, the World Health Organization (WHO) declared COVID-19 to be a pandemic. As of March 9, 2022, there have been 448.83 million cases of COVID-19 diagnosed globally, including 6.01 million deaths.[1] Although the COVID-19 vaccine has been widely used, it has failed to bring about the worldwide disappearance of the disease; many people are still facing the risks of repeated outbreaks of local epidemics as well as variant virulent strains.[3]

The term risk perception refers to an individual's subjective view of objective risks in the outside world. This concept emphasizes the influence on cognition caused by experience gained from both an individual's intuitive judgment and

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subjective feelings.[4] Risk perception can also be defined as the subjective feeling of the public and the integration of individual feelings based on objective factors such as risk communication.[5,6] Previous studies have suggested that risk perception is significantly correlated with the public's adoption of protective action recommendations and has also been identified as an important mediating factor between government intervention and public behavior during COVID-19.[7,8] In the study of Chisty et al, if people had a higher perceived risk of COVID-19, they were more likely to seek COVID-19 related information than those with a lower perceived risk.[9] An increase in risk information and information-seeking behaviors can lead to positive outcomes by helping to improve prevention, decrease the risk of infection, reduce uncertainty, and alleviate panic.[10] However, it has also been proposed that the characteristics of the process of information seeking is an important variable that affects risk perception.[9,11] According to the social amplification risk framework (SARF) proposed by Kasperson, risk perception can be enhanced or diminished by various amplification stations, such as media, interpersonal interactions, and social media.[12,13] Furthermore, instant information dissemination and network connections can make risk signals spread quickly and widely, and even form a risk amplification effect on a global scale.[11] Moreover, the continuous generation of massive amounts of information can cause risk signals to accumulate repeatedly, making amplifying risks and making public panic more likely. In addition, the public also faces a challenge in identifying reliable sources of accurate information.[14] These aspects may lead to public distrust of the government and the government's pandemic response.[15] However, there are currently no studies that study the applicability of the SARF theory during the COVID-19 pandemic. How people's perceptions of risk are affected by different information sources during the COVID-19 pandemic remains unclear.

In this modern the age of information, it has become very common to acquire health-related information through diverse media.[16] Therefore, after the outbreak of COVID-19, information diffusion, information seeking, and risk perception have gradually become the focus of much research in the field of public health. Studies on risk information seeking suggest that whether an epidemic can be controlled in a short time is closely related to whether people understand the COVID-19 information and comply with the effective measures taken by the government in response to the epidemic.[17] The characteristics of people's information-seeking behaviors include channels of information seeking, people's trust in different channels, information content, nature of information (positive or negative), and the frequency of information seeking,[10] and a growing body of literature indicates that variations in the characteristics of information-seeking behaviors can produce variations in effects on people's cognitive, emotional, attitudinal, and behavioral outcomes in dealing with the COVID-19 epidemic.[10,18–20] One survey of 637 pregnant women found that women who sought information from sources such as the WHO, the Center for Disease Control and Prevention (CDC), local departments of health, and public media were more likely to take more actions that were classified as effective protective actions and fewer measures that were classified as potentially harmful than women who obtained information from other sources, such as politicians or relatives and friends.[21] Another large-scale study also suggested that there was an association between information-seeking channels and COVID-19 knowledge,[22] and yet another concluded that if people do not perceive the risk of any emergency and do not seek correct information, raising awareness about a pandemic and managing the emergency will be challenging for health authorities.[9] The right message at the right time from the right messenger through the right medium can save lives, as it were. However, few studies have explored the potential impact of different characteristics of information acquisition behavior on risk perception during the COVID-19 pandemic, especially from the perspective of specific information-seeking channels, people's trust in these information channels, information content, the content of the information, and frequency of information-seeking.

Thus, this study examines the impact of the characteristics of different information-seeking behaviors on risk perception during the COVID-19 pandemic among the Chinese public. To address this problem, we propose the following hypotheses:

Hypothesis 1 (H1): Different information-seeking channels affect risk perception of COVID-19 differently.

Hypothesis 2 (H2): Level of trust in different information channels affects risk perception of COVID-19 differently.

Hypothesis 3 (H3): The content of information affects risk perception of COVID-19.

Hypothesis 4 (H4): The proportion of negative information affects risk perception of COVID-19.

Hypothesis 5 (H5): Frequency of information-seeking affects risk perception of COVID-19.

Methods

Participants

This cross-sectional study was conducted in three communities in the Hunan province of China from February, 2021 to March, 2021 using a convenience sampling method.

The populations of the three communities were 10,000, 48,000, and 30,000, for a total of 88,000. The three communities all implemented strict COVID-19 prevention and control measures. Nucleic acid testing points were set up to provide residents with free nucleic acid testing at least once a week. In addition, volunteers or community workers disinfected crowded places such as supermarkets, residential buildings, and public toilets every day. An informed consent form was signed online by all participants in the study, and our questionnaire QR code, downloaded from the online platform (Questionnaire Star, URL: https://www.wjx.cn/), was distributed as a picture. Residents were invited to scan the QR code, and before they completed the questionnaire the research background, purpose of the study, rules for anonymity and confidentiality were explained. Participants were included if they were aged 18 years or older; had the ability to speak and understand Chinese; and understood the purpose and process of the study and agreed to participate. Our quality-control measures for the survey data were as follows. Questionnaires finished in less than 3 minutes were discarded; screening questions were set up, and questionnaires with contradictory answers to these questions were deleted. The study was reviewed and approved by the ethics committee of the Third Xiangya Hospital of Central South University (no. 2020-S028).

Measures

Public Health Emergency Risk Perception Scale (PHERPS)

In our previous study,[23] we developed the public health emergency risk perception scale (PHERPS) to assess the level of public perception of risk in the face of public health emergencies. The public health emergency in this survey was taken to be COVID-19. The scale had nine items divided into three dimensions, "dread risk perception", "severe risk perception", and "unknown risk perception". Each question was answered on a Likert 5-point scale, with scores of 1–5 representing strong disapproval, disapproval, neutrality, approval, and strong approval, respectively, for a total possible score of 9–45 points. The higher the score, the higher the risk perception of public health emergencies. Cronbach's α was 0.793 for the total scale and ranged between 0.687 and 0.697 for the individual dimensions. The split-half coefficient was 0.861 for the total scale and ranged from 0.727 to 0.856 for individual dimensions.

Information-Seeking Behaviors Questionnaire (ISBQ)

The information-seeking behavior questionnaire was prepared by our research group with reference to similar studies on Severe Acute Respiratory Syndromes (SARS) in 2003 and African Swine Fever (ASF) in 2018.[24,25] The questionnaire included questions about COVID-19 information-seeking channels, level of trust in these different channels, their information content, proportion of negative information, and information-seeking frequency. The detailed content and scoring methods are shown in Table 1.

Sociodemographic Information

The following information about participants' sociodemographic characteristics was collected using a self-made questionnaire: gender, age, marital status, education level, occupational status, family annual income per capita, whether the respondent had prior similar experience to dealing with COVID-19, for example severe acute respiratory syndrome (SARS) or avian influenza, whether the respondent had been diagnosed with COVID-19 in the area where they lived (same neighborhood, street, or village), and exposure history in the epidemic area.

Statistical Methods

Data were analyzed using IBM SPSS Statistics (Version 24.0, Armonk, USA). Continuous variables were expressed as means ± standard deviations (M±SD), and categorical variables were summarized as absolute numbers and percentages. We used Pearson correlation analysis to determine the correlation between the continuous variables in the ISBQ (including the level of trust in information channels, the proportion of negative information, and the frequency of

Table 1 Characteristics of Information-Seeking Behaviors

Characteristics	Classification	Scoring
Information- seeking channels	New media (computer/smartphone/tablet computer/others) Traditional media (television/broadcast/newspaper) Local propaganda (community/village/street/others) Interpersonal communication (family members/friends/coworkers/neighbors/others)	1 = No; 2 = Yes
Level of trust in information channels	New media (computer/smartphone/tablet computer/others) Traditional media (television/broadcast/newspaper/others) Local propaganda (community/village/street/others) Interpersonal communication (family members/friends/coworkers/neighbors/others)	1 = No credibility; 2 = Little credibility; 3 = Not sure; 4 = Credible; 5 = Strongly credible
Information content	Statistics of COVID-19 (infection cases/died cases/cured cases/others) Knowledge of COVID-19 (pathogen/modes of transmission/susceptible populations/source of infection/others) Protective behavior (self-observation/washing hands/wearing masks/others) Rescue information (hospital building/public donations/others) Policy information (holiday extension/community lockdown/others) Personal related information (the epidemic situation in personal place of residence/infection information for passengers in one transportation facility/work suspended or resumed/others)	1 = No; 2 = Yes
Proportion of negative information	Proportion of negative information in all COVID-19 information obtained	1 = None or a few; 2 = About half; 3 = Most or all
Frequency of information seeking	Frequency of daily COVID-19 information seeking behavior	1 = 0–3/d; 2 = 4–10/d; 3 = More than 10/d

information seeking) and risk perception, and we used point-biserial correlation analysis to determine the relationship between the binary variables in the ISBQ (including information-seeking channels and information content) and risk perception. The scores of risk perception among participants with different sociodemographic characteristics were compared using the independent-sample *t*-test or analysis of variance as appropriate. In addition, we used multiple linear regression to test the determining factors that affected risk perception. Multiple linear regression analysis with the stepwise method ($\alpha_{in} = 0.05$, $\alpha_{out} = 0.10$) was conducted with the score of risk perception as a dependent variable and the variables with statistical significance in univariate analysis and the characteristics of different information-seeking behaviors as independent variables. Table 2 shows the independent variable assignment from multiple linear regression analysis of risk perception. Since information-seeking channels and information content are not mutually exclusive, each channel or content was treated as an indicator variable, dichotomized by whether or not the channel or content had been selected. We set the threshold significance level was set at 0.05 for a two-sided test.

Results

Sociodemographic Characteristics

In total we collected 3048 questionnaires. After quality control, we were left with 2611 valid questionnaires, for an effective questionnaire rate of 85.66%. The mean age of the participants was 31.98 years (SD = 9.68 years), and the majority of this population was female (69.59%), and 70.16% had bachelor or junior degree. Other sociodemographic characteristics of the participants are shown in Table 3.

Scores of Risk Perception for COVID-19

The total score of risk perception was 36.48 ± 5.20 points, and the mean item score was 4.05 ± 0.58 points. The domains of COVID-19 risk perception with declining mean scores were severe risk perception (4.36 ± 0.58), dread risk perception (4.11 ± 0.82), and unknown risk perception (3.68 ± 0.83) (Table 4).

Table 2 Independent Variables Assignment of Analysis on Influencing Factors of Risk Perception

Variables	Assignment
Gender	Male = 1; female = 2
Age group	18–35 = 1; 36–59 = 2; ≥60 = 3
Marital status	Single = 1; Married = 2;
Educational level	Junior middle school or below = 1; High school or polytechnic school = 2; Bachelor or college degree = 3; Master degree or above = 4
Occupational status	None = 1; Full/Part time = 1
Family annul income per capita (CNY)	<50,000 = 1; 50,000–100,000 = 2; 100,000–200,000 = 3; >200,000 = 4
Similar experience	None = 1; Yes = 2
Confirmed COVID-19 cases in place of residence	None = 1; Yes = 2
Exposure history in epidemic area of COVID-19	None = 1; Yes = 2
Information-seeking channels - New media; Traditional media; Local propaganda; Interpersonal communication	No = 1; Yes = 2
Level of trust in information channels - New media; Traditional media; Local propaganda; Interpersonal communication	No credibility = 1; Little credibility = 2; Not sure = 3; Credible = 4; Strongly credible = 5
Information content - Statistics of COVID-19; Knowledge of COVID-19; Protective behavior; Rescue information; Policy information; Personal related information	No = 1; Yes = 2
Proportion of negative information	None or a few = 1; About half = 2; Most or all = 3
Frequency of information seeking	1 = 0–3/d; 2 = 4–10/d; 3 = more than 10/d

Table 3 Sociodemographic Profiles and Univariate Analysis for Risk Perception (N=2611)

Items	Classification	n (%)	Scores on Risk Perception (M±SD)	*t*/*F*	*P*-value
Gender	Male	794 (29.26)	36.32±5.50	−1.034[a]	0.301
	Female	1817 (69.59)	36.55±5.07		
Age group	18–35y	1763 (67.52)	36.42±5.20	0.162[b]	0.850
	36–59y	835 (31.98)	36.40±5.22		
	>60y	13 (0.50)	36.31±4.85		
Marital status	Single	1067 (40.87)	36.16±5.14	−2.632[a]	0.009**
	Married	1544 (59.13)	36.70±5.24		
Education level	Junior middle school or below	141 (5.41)	35.96±5.41	2.112[b]	0.097
	High school or polytechnic school	264 (10.11)	36.95±5.72		
	Bachelor or college degree	1832 (70.16)	36.55±5.12		
	Master degree or above	374 (14.32)	36.05±5.11		
Occupational status	None	715 (27.38)	36.67±5.07	1.163[a]	0.245
	Full/Part time	1896 (72.62)	36.41±5.25		
Family annul income per capita (CNY)	<50,000	700 (26.81)	36.28±5.32	1.297[b]	0.274
	50,000–100,000	700 (26.81)	36.41±5.27		
	100,000–200,000	766 (29.34)	36.49±5.16		
	>200,000	445 (17.04)	36.89±4.96		
Similar experience	Yes	656 (25.12)	36.41±5.27	−0.406[a]	0.685
	No	1955 (74.88)	36.50±5.18		
Confirmed COVID-19 cases in place of residence	Yes	317 (12.14)	37.12±5.04	2.325[a]	0.020*
	No	2294 (87.86)	36.39±5.22		
Exposure history in epidemic area	Yes	104 (3.98)	36.87±4.74	0.784[a]	0.433
	No	2507 (96.02)	36.46±5.22		

Note: *p<0.05 **p<0.01; [a]Two-sample t-test; [b]One-way analysis of variance.

Table 4 Participants' Risk Perception for COVID-19 (N=2611)

Dimensions	Items	Average Score for Each Item	Average Score for Each Domain
Severe risk perception	Item 1 The pandemic is highly contagious	4.69±0.55	4.36±0.58
	Item 2 The pandemic is widespread	4.58±0.66	
	Item 3 The health damage caused by the pandemic is fatal	3.84±1.05	
Dread risk perception	Item 4 I am afraid of being infected	3.86±1.12	4.11±0.82
	Item 5 I am afraid the people I care about will be infected	4.20±0.94	
	Item 6 The pandemic is terrible	4.26±0.82	
Unknown risk perception	Item 7 Not enough is known about the pandemic	4.16±0.84	3.68±0.83
	Item 8 It is difficult to predict whether a person is infected or not	3.68±1.12	
	Item 9 Infections that have occurred may not be accurately detected	3.22±1.18	

Characteristics of Different Information-Seeking Behaviors

Data on the characteristics of different information-seeking behaviors are presented in Table 5. New media (80.20%) was the most frequently used source of information, with interpersonal communication being used the least (21.83%). Traditional media were the most trusted source of COVID-19 information (4.47±0.71), whereas interpersonal communication was the least trusted source (3.12±0.89). Data on COVID-19 infections and deaths were the most frequently queried by the public, and rescue information was the lowest. Approximately 30.0% of respondents reported that most or all of the COVID-19 information they sought was negative, and approximately one in five respondents reported that they sought COVID-19 information more than 10 times per day.

Table 5 Data on the Characteristics of Different Information-Seeking Behavior (N=2611)

Characteristic	N	%
Information-seeking channel - New media	2094	80.2
Information-seeking channel - Traditional media	1748	66.95
Information-seeking channel - Local propaganda	717	27.46
Information-seeking channel - Interpersonal communication	570	21.83
Level of trust in information channel - New media (M±SD)	3.37±0.80	
Level of trust in information channel - Traditional media (M±SD)	4.47±0.71	
Level of trust in information channel - Local propaganda (M±SD)	3.85±0.88	
Level of trust in information channel - Interpersonal communication (M±SD)	3.12±0.89	
Information content - Statistics of COVID-19	2367	90.65
Information content - Knowledge of COVID-19	2151	82.38
Information content - Protective behavior	2143	82.08
Information content - Rescue information	1564	59.90
Information content - Policy information	1756	67.25
Information content - Personal related information	1805	69.13
Proportion of negative information		
None or a few	1593	61.01
About half	684	26.2
Most or all	334	12.79
Frequency of information-seeking		
0–3/d	793	30.37
4–10/d	1192	45.65
More than 10/d	626	23.98

Correlation Between the Characteristics of Different Information-Seeking Behaviors and Risk Perception

This study measured COVID-19 risk perception and the characteristics of different information-seeking behaviors among Chinese citizens across various dimensions and analyzed the associations between them. Table 6 presents the Pearson correlation coefficients among the characteristics of different information-seeking behaviors and risk perception. The scores for the total risk perception scale were positively correlated with the characteristics of information-seeking behaviors at a statistically significant level ($p < 0.001$), except for seeking information from traditional media and level of trust in traditional media. However, risk perception was negatively correlated with these two variables ($p < 0.001$).

The Influencing Factors of Risk Perception

As shown in Table 3, married participants had a higher level of risk perception than single participants, and the difference was statistically significant. In addition, those who lived in areas with confirmed COVID-19 cases reported higher risk perceptions. The results of our multivariate linear regression analysis showed that nine determining factors were reserved, including seeking information from new media or traditional media, level of trust in new media, traditional media and local propaganda, information content being about protective behavior and personal related information, proportion of negative information and frequency of information seeking, accounting for 13.7% of the variation in predicting the level of risk perception (Table 7).

Discussion

Public risk perceptions when facing public health events can affect behavior patterns, and decision-makers can accurately and effectively make targeted decisions only by accurately grasping the public's risk perceptions of emergencies.[26] In this study, the total score of risk perception was 36.48 ± 5.20, which is similar to the result of another study on Chinese university students.[27] The public's perception of the epidemic in the "severe risk" dimension was the strongest, reflected

Table 6 Correlation Between the Characteristics of Information-Seeking Behaviors and Risk Perception (N=2611)

Variables	Total Score of Risk Perception	Severe Risk Perception	Dread Risk Perception	Unknown Risk Perception
Information-seeking channel - New media	0.227**	0.101**	0.206**	0.196**
Information-seeking channel - Traditional media	−0.061**	−0.012	−0.044*	−0.092**
Information-seeking channel - Local propaganda	0.061**	0.085**	0.049*	0.018
Information-seeking channel - Interpersonal communication	0.077**	0.064**	0.052**	0.066**
Level of trust in information channel - New media	0.130**	0.126**	0.088**	0.097**
Level of trust in information channel - Traditional media	−0.071**	−0.078**	−0.056**	−0.146**
Level of trust in information channel - Local propaganda	0.069**	0.146**	0.063**	−0.020
Level of trust in information channel - Interpersonal communication	0.112**	0.149**	0.070**	0.059**
Information content - Statistics of COVID-19	0.064**	0.047*	0.062**	0.036
Information content - Knowledge of COVID-19	0.061**	0.045*	0.063**	0.035
Information content - Protective behavior	0.076**	0.083**	0.089**	0.013
Information content - Rescue information	0.058**	0.050*	0.062**	0.026
Information content - Policy information	0.069**	0.070**	0.066**	0.029
Information content - Personal related information	0.088**	0.087**	0.078**	0.046*
Proportion of negative information	0.096**	0.073**	0.087**	0.062**
Frequency of information-seeking	0.221**	0.052**	0.187**	0.241**

Note: *p<0.05 **p<0.01.

Table 7 Multivariate Linear Regression Analysis on the Risk Perception (N=2611)

Variables	Unstandardized Regression Coefficient	Standard Error	Standardized Regression Coefficient	t	*P*-value
Constant	32.989	1.002	-	32.908	0.000**
Information-seeking channel - New media	2.190	0.251	0.168	8.716	0.000**
Information-seeking channel - Traditional media	−0.957	0.209	−0.087	−4.586	0.000**
Level of trust in information channel - New media	0.537	0.134	0.082	4.011	0.000**
Level of trust in information channel - Traditional media	−0.709	0.155	−0.097	−4.567	0.000**
Level of trust in information channel - Local propaganda	0.551	0.132	0.093	4.171	0.000**
Information content - Protective behavior	0.655	0.264	0.048	2.477	0.013*
Information content - Personal related information	0.513	0.218	0.046	2.352	0.019*
Proportion of negative information	1.487	0.139	0.203	10.721	0.000**
Frequency of information- seeking	0.333	0.132	0.047	2.518	0.012*

Note: *p<0.05 **p<0.01; R^2=0.137, F=42.387, p<0.001.

by the perception of its strong contagiousness, widespread prevalence, and risk of fatality, and the next strongest perception was the dread of the pandemic risk perception, which we defined as the worry about or fear of infection of themselves, their relatives, or their friends. Risk of the unknown was the lowest perceived risk.

The COVID-19 pandemic has led to the development of vaccines and therapeutic regimens at an unprecedented pace.[28] However, new virus variants are still emerging, and this may reinforce the public's unknown risk perception of COVID-19. Ezati et al[29] conducted a cross-sectional survey based on the protective motivation theory, and showed that a high enough perception of the severity of COVID-19 could encourage people to engage in protective behavior. Ning et al[30] also found a positive relationship between protective behaviors and severe risk perception for Chinese citizens. However, some studies have found that risk perception was negatively related to psychological well-being among those who were ineffective at regulating emotions.[17,31,32] Excessive risk perception may aggravate anxiety and fear, and lead to irrational behaviors.[18] In addition, the results of one large cross-sectional study covering 112 countries indicated that higher risk perception of COVID-19 was significantly associated with less positive or more negative emotions.[33] Therefore, it is necessary for the government to provide timely and correct psychological counseling services during the epidemic to reduce excessive risk perception and manage emotional distress.

The Impact of New Media and Traditional Media on Public COVID-19 Risk Perception

Traditional media, including television, newspaper, radio broadcasts, and magazines, are important channels for people to get information during COVID-19. However, with the rapid development of science and technology, the effects of new media, such as the Internet and social platforms, have gradually become important. In traditional media channels, individuals play the role of passive information receiver, but in new media channels, individuals can be both information receivers and information providers.[34] Considering these differences between traditional media and new media, we investigate the impact of traditional media and new media on people's risk perceptions separately.

This study shows that new media, as represented by social media and search engines, was the main channel by which people in our survey obtained epidemic information, and similar results have also been found in previous studies.[17,18,35,36] However, the level of trust that the public in our survey put in such information channels was significantly lower than that of traditional media and local propaganda. The results of our multivariate linear regression indicate that respondents seeking COVID-19 information from new media channels and level of trust in new media were influencing factor in their risk perception. Additionally, Pearson correlation analysis showed that the total score of risk perception was positively correlated with seeking information from new media channels and level of trust in new media.

This suggests that people who more often used and put more trust in new media had a higher risk perception level, which is consistent with several previous studies.[37–39] During the COVID-19 pandemic, new media played a role in providing both factual and subjective information. However, at least one study has concluded that much of this negative subjective information may have contributed to "excessive" panic among the public.[40]

Traditional media were the second most popular information-seeking channel in this study. However, in some other studies, the majority of people still preferred conventional media,[9,22,41] and our current study did identify that traditional media were the most trusted channel for information acquisition.[41,42] The results of our multivariate linear regression and Pearson correlation analysis showed that lower risk perception was associated with both greater access to information from and greater trust in traditional media. In China and some other countries, the news on traditional media, especially TV, is controlled by the state. In these cases, the voices behind the news are the government or delegated authority figures, and some people may be inclined to trust these information sources. However, if the government lacks authenticity and transparency when publishing COVID-19 information, the public's social trust can become reduced, leading to increased information seeking through new media.[14,43]

The Impact of Local Propaganda and Interpersonal Communication on Public COVID-19 Risk Perception

In this study, although local propaganda was an information channel with a low utilization rate, public trust in it was higher than that of new media. The reason may be that local propaganda in various regions is mostly carried out in the form of public broadcasting and notices, and the public is more passive in its in consumption of this information. However, because the main body of information dissemination is still local governments or health institutions, some members of the Chinese public may still trust the information obtained from this channel. In addition, the results of both regression analysis and correlation analysis suggest that the public's trust in local propaganda can increase their risk perception, which agrees with previous studies.[44–46] Ye et al[46] found that trust in the local media helped decrease the infection rate, with risk perception toward infectious diseases partly mediating this relationship and Cheng et al[44] indicated that the timelier, more adequate, more understandable, more feasible, and more available the risk information transmitted by the community, the more satisfied the public was with the community's risk management.

In addition, the least frequently used channel was interpersonal communication, and this was also the least trusted source of information. Although we found that information seeking through interpersonal communication and trust in interpersonal communication were both positively correlated with risk perception, there was no statistical significance in the impact of these two factors on risk perception in our regression analysis. However, the support gained from communication with friends and family may help decrease emotional and social loneliness caused by the mandatory lockdowns in China during COVID-19.[47]

The Impact of Information Content on Public COVID-19 Risk Perception

Our analysis of the content of information sought showed that COVID-19 data was the most concerning to the public, followed by COVID-19 knowledge and protection behavior information. The least attention was given to rescue information, such as hospital construction and rescue services provided by medical teams, and this finding appears to be consistent with previous studies.[9,17,35] We also found that all content of information was positively correlated with the level of risk perception, but after our multiple linear regression analysis, only the information about protective behavior and personal information increased the level of risk perception.

A positive effect of risk perception on protective behavior has been found in previous studies on COVID-19.[9,22] However, this study found that paying attention to and seeking protective information in turn increased the level of perceived risk. We speculate that exposure to "too much" information about self-protection may give seekers a clearer sense of COVID-19 susceptibility and severity. In addition, personal information related to the epidemic, such as the epidemic situation near where the respondents lived and the infection of passengers sharing the same transportation modes, is closely related to residents' own interests, and this may cause people who pay more attention to the information have a higher risk perception.

The Impact of Negative Information and the Frequency of Information-Seeking on Public COVID-19 Risk Perception

In this study, more than 30% respondents believed that among all the information received, half or more was negative, suggesting that the dissemination of various kinds of negative information in the epidemic was fairly widespread. In addition, our data analysis showed that exposure to more negative information was associated with higher risk perception. Fang et al[48] have pointed out that compared with positive information, the public tends to pay more attention to negative information and that this psychological feature, combined with the processing and dissemination of risk information by different media, has expanded the public's risk perception to a certain extent. Media channels may increase the abundance of information and reduce insecurity about what is going on, but exposure to a large amount of negative information may lead to emotional reactions such as anxiety, uneasiness, and fear, and may even cause physical reactions such as dizziness, headache, chest tightness, and shortness of breath, as well as eating and sleep disorders.[49]

Furthermore, the risk perception of COVID-19 was also higher among people who performed more queries for information. An investigation conducted during an outbreak of the Middle East respiratory syndrome coronavirus (MERS) in South Korea showed that social media exposure was positively related to the formation of risk perceptions and that social media exposure could contribute to a decrease in optimistic confidence bias for individuals with higher levels of self-efficacy, which in turn could increase their risk perceptions of MERS.[39] Moreover, some studies have found that the more individuals seek COVID-19 information, the more likely they are to be emotionally distressed.[18,19] Although information seeking can be beneficial for choosing healthy behaviors during the COVID-19 pandemic, "excessive" information search may also lead to an increase in health anxiety. Future researchers may want to examine at what level information seeking promotes health behaviors without causing an increase in anxiety.

Study Limitations

Our study has several limitations. First, the memory errors of respondents may have affected the self-reported survey data and thus the accuracy of our results. Second, this study was conducted in three communities of China, so our results may not be representative of the country as a whole or for other countries. Additionally, the sample was mostly composed of young people, which may have influenced the results of the study by biasing it toward a higher response rate in "new media" and its relationship with risk perception. Further studies with larger samples and more areas should be carried out. Finally, all variables in this cross-sectional study were collected in a questionnaire survey, so we were unable to determine changes over time in people's information-seeking behaviors and risk perception during COVID-19. Continuous-follow-up investigations should be carried out to address this.

Conclusion

In this study, we investigated the characteristics of people's information-seeking behaviors and the impact of different information-seeking behaviors on risk perceptions during COVID-19. Our results show that new media were the most frequently used source of information seeking and that traditional media were participants' most trusted source of COVID-19 information. Epidemic-related data were the information most sought by participants. Different channels of information acquisition and the public's trust in these information channels, the content of information, the proportion of negative information, and the frequency of information seeking all had an impact on the risk perception. Given these findings, we can make some recommendations for information and risk perception management during the COVID-19 pandemic. New media platforms should strengthen supervision over the transparency and authenticity of published information to prevent excessive panic among residents caused by excessive flooding of false and negative information. Second, governments or healthcare institutions can also use new media to disseminate health care knowledge and improve residents' ability to protect themselves. Finally, excessive and unavoidable negative information may have a negative impact on the public's mental health, so psychological care institutions can provide mental health support services to the public through new media and traditional media.

Data Sharing Statement

Some or all data during the study are available in a repository or online in accordance with funder data retention policies.

Ethics Statement

This study was conducted in accordance with the Declaration of Helsinki, and the study protocol was reviewed and approved by the ethics committee of the Third Xiangya Hospital of Central South University (no.2020-S028). All participants reviewed the consent form before they participated in the study.

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Disclosure

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