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ABOUT COVER

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AIMS AND SCOPE

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   WJP mainly publishes articles reporting research results and findings obtained in the field of psychiatry and covering a wide range of topics including adolescent psychiatry, biological psychiatry, child psychiatry, community psychiatry, ethnopsychology, psychoanalysis, psychosomatic medicine, *etc*.

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The *WJP* is now abstracted and indexed in Science Citation Index Expanded (SCIE, also known as SciSearch®), Current Contents/Clinical Medicine, Journal Citation Reports/Science Edition, PubMed, and PubMed Central. The 2020 edition of Journal Citation Reports® cites the 2019 impact factor (IF) for *WJP* as 3.545; IF without journal self cites: 3.545; Ranking: 46 among 155 journals in psychiatry; and Quartile category: Q2.

RESPONSIBLE EDITORS FOR THIS ISSUE

ORIGINAL ARTICLE

Basic Study

COVID-19 knowledge, risk perception, and information sources among Chinese population

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Institutional review board statement: The protocol used in this study was in accordance with the Declaration of Helsinki and was approved by the Ethics Committee at Northwest Minzu University Lanzhou, China.

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Data sharing statement: The aggregate data supporting findings contained within this manuscript will be shared upon request submitted to the corresponding author.

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Abstract

BACKGROUND
Measures for effective control of the coronavirus disease 2019 (COVID-19) pandemic include identifying the causal organisms, applying appropriate therapies, and developing vaccines, as well as improving understanding among the general public.

AIM
To evaluate the knowledge, awareness, perception, and response of the general public to COVID-19 in China.

METHODS
A detailed questionnaire comprising 47 questions designed in both English and Chinese was developed. The survey was conducted *via* WeChat, a multipurpose messaging, social media, and mobile payment app that is widely used by the Chinese population. In total, 1006 participants responded, and most of them were from different provinces of mainland China.

RESULTS
Overall, this comprehensive survey revealed that the general public in China is highly aware of the basic information concerning COVID-19 and its precautions. Interestingly, more respondents (99.3%) were aware of the term severe acute respiratory syndrome (SARS) than COVID-19 (97.2%) and Middle East respiratory syndrome (MERS) (73.4%). Among them, 2.4%, 1.6%, and 0.9% said that they or their family members or friends were affected by COVID-19, SARS, and MERS,

respectively. The majority of the respondents (91.2%) indicated that knowledge about COVID-19 was received mainly from WeChat, followed by TV (89%), friends (76.1%), and QQ (a Chinese instant messaging software service) (57.7%).

CONCLUSION
The general public in China is highly aware of COVID-19 and the necessary precautions. Unexpectedly, 2.8% of the participants were unaware of the current epidemic. The remaining information gaps highlight the necessity of further enhancing awareness and preparedness.

Key Words: COVID-19; Knowledge; WeChat; China; Pandemic; Knowledge

Core Tip: This study comprehensively evaluated the knowledge, awareness, and perceptions about coronavirus disease 2019 (COVID-19) among the general Chinese population. Overall, the general public is well aware of the COVID-19 epidemic, knows what COVID-19 is, and is familiar with the precautionary measures. Strikingly, this survey indicated that 2.8% of the participants in China were unaware of the current COVID-19 epidemic.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is caused by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and is now affecting the global population[1]. In addition to significant losses in terms of morbidity and mortality, COVID-19 has imposed major negative impacts on society and the economy in various aspects. COVID-19 was initially sparked in Wuhan, the capital of Hubei Province, and subsequently spread to the entire province and other parts of China, and eventually to the rest of the world[2]. Measures for effective control of outbreaks include identifying the causal organisms, applying appropriate therapies, and developing vaccines, as well as promoting understanding among the general public.

Syndemics is a group of interlinked health issues associated with two or more conditions that interact synergistically and cause an increased disease burden in the population. At this moment, COVID-19 and an array of noncommunicable diseases interact on a social and economic background, which exacerbates its adverse effects[3]. Strict guidelines with specific emphasis on protective measures such as city lockdowns, travel bans, and within-population quarantines were developed by the authorities for controlling the pandemic. As these measures lead to physical inactivity, they also had an adverse impact on health, such as promoting obesity, premature ageing, cardiovascular vulnerability, bone loss, muscle atrophy, decreased aerobic capacity[4], and psychological issues[5-8]. Physical activity is vital for public health[6], as it acts on the cardiovascular and respiratory systems[7].

Furthermore, the effectiveness of epidemic control implementations relies substantially on the support and cooperation of the public. Thus, awareness and knowledge about the epidemic are essential[9-11]. Despite the experience of the SARS outbreak in 2003 in China, the early response to the COVID-19 outbreak was inadequate from both the Chinese authorities and the general public[12]. Subsequent implementation of strict control measures by the authorities with strong support and cooperation from the public finally resulted in the control of COVID-19 in China. However, COVID-19 has grown into a pandemic and may become endemic[13]. Knowledge gaps always exist about disease epidemics, their potential risks, and the clinical spectrum[13]. Thus, we designed and conducted this survey to evaluate the knowledge, awareness, perception, and response of the general public to COVID-19 in China.

MATERIALS AND METHODS

Study design and participants

A detailed questionnaire comprising 47 questions related to COVID-19 with some questions about SARS and Middle East respiratory syndrome (MERS)[14-16] was designed in both English and Chinese. The survey was conducted *via* WeChat, a Chinese multipurpose messaging, social media, and mobile payment app. It is widely used in China, with monthly active users estimated at one billion.

Knowledge about COVID-19, MERS, and SARS was assessed with questions about whether they had heard about these infections, whether they or their family members or friends had been infected, whether they knew what COVID-19 is and knew its causes, whether they knew the zoonotic origin of the infection, whether they ever ate civet or other wild animals, and whether they knew about the death rate from COVID-19. The participants were assessed regarding COVID-19 risks and associated factors along with their knowledge of possible control measures to avoid the infection. The participants were also asked about general signs and symptoms of the disease and from where they obtained information regarding this infection.

Statistical analysis

Descriptive and inferential statistics were calculated using SPSS version 20.0 for Windows (SPSS Inc., Chicago IL, United States). Awareness and knowledge about COVID-19, SARS, MERS, and related factors are shown as percentage values. All independent variables were divided into two or more categories. Variables that were statistically significant in the univariate analyses were included in the final multivariate logistic regression analysis using SPSS. All statistical tests were two-sided, with a P value < 0.05 considered statistically significant.

RESULTS

The questionnaire was completed from March 11 to 14, 2020. In total, 1006 individuals (aged 18-71 years) from all over China participated in the survey by filling out the questionnaires. The majority of our participants (99.3%) were distributed across 29 provinces of China, with 8.7% from Hubei Province and 0.7% residing outside of China (Supplementary Table 1). Among the respondents, 99.1% were Chinese and 0.9% were foreigners residing in China. Based on ethnicity, 65.4% were Hans and 34.6% were from other Chinese ethnic groups or foreigners. Approximately 63% of participants were female. The detailed sociodemographic characteristics of the participants are presented in Table 1.

Interestingly, more respondents (99.3%) were aware of the term SARS than COVID-19 (97.2%) and MERS (73.4%). Among them, 2.4%, 1.6%, and 0.9% said that they or their family members or friends were affected by COVID-19, SARS, and MERS, respectively. Most of the participants (87.4%) believed that COVID-19 is more dangerous than SARS and MERS, while 47.9% of participants answered that the death rate for COVID-19 patients is less than that of SARS and MERS (Table 2). Approximately 81% of respondents answered that SARS-CoV-2 infection could be transmitted through oral, nasal, and eye routes. Up to 69.7% of people believed that the virus has been transferred from animals to humans and that bats (82.4%) are the reservoir for SARS-CoV-2. The proportion of respondents who had recently consumed wildlife meat was found to be 1.4%. A total of 62.4% of individuals thought that a treatment is available for COVID-19 (Table 2).

This study further revealed that the majority of respondents (46.4%) were experiencing psychological pressure along with economic (19.1%) losses due to the current COVID-19 epidemic in China. A total of 69.4% indicated that they still had not resumed their normal life due to the ongoing epidemic. Unfortunately, 1.5% of people replied that they had lost a loved one due to COVID-19. Furthermore, most of the participants (78%) preferred going in private cars for treatment to hospitals in cases of infection, while 2.2% refused to go to hospitals (Table 2).

Knowledge about the signs and symptoms of COVID-19, such as fever, chills, cough, shortness of breath, and flu, was known by 86.3%, 36.9%, 83.4%, 79.0%, and 53.3% of the participants, respectively. However, knowledge about other questions related to the disease incubation period was poor (Table 2). Pearson correlation analysis indicated that the risk of acquiring COVID-19 was negatively associated with general information/knowledge and knowledge about precautionary measures (Supplementary Table 2).

Table 1 Demographic characteristics of participants

Variable	Respondents	Percentage (%)
Sex		
Male	373	37.1
Female	633	62.9
Age, yr		
< 30	524	52.1
31-39	170	16.9
40-49	150	14.9
50-59	98	9.7
> 60	64	6.4
Ethnicity		
Han	658	65.4
Others	348	34.6
Residence		
Rural	372	37.0
Urban	634	63.0
Education		
Middle or less	146	14.5
Undergraduate	724	72.0
Master	88	8.7
PhD	48	4.8
Profession		
Farmer	85	8.4
Teacher	134	13.3
Doctor	73	7.3
Nurse	14	1.4
Government	129	12.8
Private	114	11.3
Students	412	41.0
Business	45	4.5
Marital status		
Married	499	49.6
Unmarried	507	50.4
Monthly income (RMB)		
< 3000	498	49.5
3001-5000	265	26.3
5001-10000	179	17.8
> 10000	64	6.4

Multivariate logistic models indicated that urban-background participants turned out to be significantly (P = 0.006) more informed regarding the death rate due to COVID-19 *vs* SARS and MERS (P = 0.006) (Supplementary Table 3). Knowledge about high death rates in patients with comorbidities was significantly associated with sex (P = 0.012), age (P = 0.001), and ethnicity (P = 0.007) (Supplementary Table 2). On the

Table 2 Positive responses on different questions related to epidemiological and clinical knowledge (total *n* = 1006)

	Numbers (*n*)	Percentage (%)
Do you know about COVID-19	978	97.2
Do you know SARS	999	99.3
Do you know MERS	738	73.4
Have you, your family members, or friends got infected with SARS-CoV-2	24	2.4
Did you or your family or friends got infected with SARS-CoV	16	1.6
Did you or your family or friend got infected MERS-CoV	9	0.9
Is COVID-19 more serious/dangerous than SARS and MERS	879	87.4
Do you know deaths due to COVID-19 are less as compared to SARS and MERS	482	47.9
Do you know SARS-CoV-2 transmitted from animals into humans	827	82.2
Have you eaten Civet ever in your life	12	1.2
Have you and your family members consumed meat of wild animals recently	14	1.4
Do you think early detection and treatment will help COVID-19 patient to recover	962	95.6
Comorbidity increases the risk of death due to SARS-CoV-2 infection	862	85.7
Wearing mask and washing hand with soap and water can minimize the risk of SARS-CoV-2 infection	946	94
Is there a cure for COVID-19	628	62.4
If you are feeling unwell, will you disclose it	993	98.7
Is your community center well furnished with basic medical facilities	610	60.6
Are you back to your routine after COVID-19 outbreak	308	30.6
DO you know SARS-CoV-2 can enter to healthy person *via* all (mouth, nose, and eye)	819	81.4
Source/origin of SARS-CoV-2 infection is animal	701	69.7
Bat is source SARS-CoV-2 infection	829	82.4
COVID-19 affected you psychologically	467	46.4
COVID-19 affected you economically	192	19.1
Are you back to your routine after COVID-19 outbreak (no)	698	69.4
Have you lost family member or friend in COVID-19 outbreak	15	1.5
If you are feeling unwell how will you go to hospital (own car)	785	78.0
If you are feeling unwell you will not go hospital	22	2.2
Signs and symptoms		
Fever	868	86.3
Cough	839	83.4
Chills	371	36.9
Breathing difficulty	795	79.0
Flue like symptoms	538	53.5
All above	480	47.7
Do not know	8	0.8

COVID-19: Coronavirus disease 2019; SARS: Severe acute respiratory syndrome; MERS: Middle East respiratory syndrome; SARS-CoV-2: Severe acute respiratory syndrome coronavirus 2.

other hand, information about the protective effects of wearing masks and washing hands with soap for at least 30 s was significantly higher among women ($P = 0.007$) and rural residents ($P = 0.007$) (Supplementary Table 3). Chinese people, compared to foreigners ($P = 0.024$), and farmers, compared to other professions ($P = 0.001$), were

significantly more satisfied with their community health centre facilities (Supplementary Table 4).

The majority of respondents (91.2%) indicated that information about COVID-19 was received mainly from WeChat, followed by TV (89%), friends (76.1%), and QQ (a Chinese instant messaging software service) (57.7%). Some participants said that they received information related to COVID-19 from newspapers (35.5%), magazines (29.2%), WhatsApp (24.9), and Facebook (24.0%), as shown in Figure 1.

DISCUSSION

Preparing the general population for epidemics or pandemics of infectious diseases is not a static or binary exercise but a dynamic state that is continuously changing[16,17]. Therefore, different states prepare their populations with different methods built on their interpretation of disease outbreak threats and global contracts, such as the International Health Regulations[18].

This study represents a comprehensive survey report about the knowledge, awareness, perception, and response of the general public in China regarding COVID-19. Our results indicate that knowledge and awareness of COVID-19 are high among the general Chinese population. Interestingly, the majority of participants said that WeChat was their main source of information, indicating that valuable information about diseases can be effectively communicated among the general public *via* WeChat in mainland China[19]. Moreover, information dissemination through health departments was surprisingly low (48.1%). As 37% of the participants live in rural areas, these people do not regularly engage with doctors, practitioners, or healthcare officials. This might be the possible cause of their low level of knowledge and awareness about different aspects of COVID-19. Interestingly, WhatsApp and Facebook were not the main sources of information for respondents in mainland China; therefore, information and recommendations regarding COVID-19 and other diseases from international stakeholders such as the World Health Organization should use all possible resources to increase knowledge and awareness among the public.

This study was based on an online questionnaire method; hence, limitations such as recall and social desirability biases cannot be excluded. However, the impact of these biases in this study is difficult to assess, as other similar studies have not been conducted so far. The inclusion of innovative interventional methods with informative evaluation plans to monitor the level of knowledge among the community, respond to their needs, and fill the gaps with better preventive methods would be helpful in prospective research.

CONCLUSION

In summary, this study comprehensively evaluated knowledge, awareness, and perceptions about COVID-19 among the general Chinese population. The overall knowledge, awareness, and attitudes about the disease are at a high level, but strikingly, 2.8% of the participants in China were unaware of the current COVID-19 pandemic, which is unexpected. Therefore, we emphasize the importance of initiating health promotion programs to educate the public and healthcare workers about infectious diseases in general for better preparedness for future epidemics and pandemics.
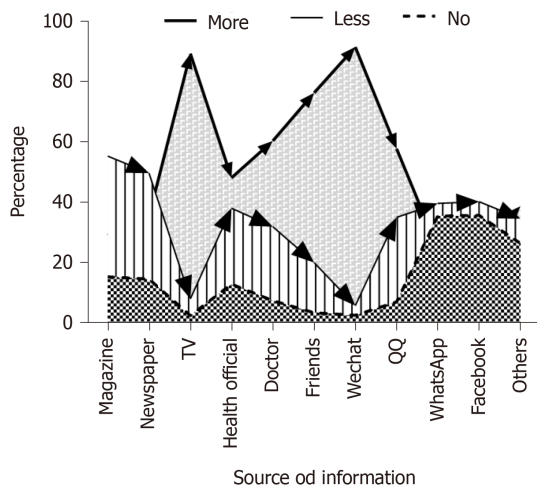
Figure 1 Source of information (little, much, and no) about coronavirus disease 2019. WeChat is a Chinese multi-purpose messaging, social media and mobile payment app. QQ is a Chinese instant messaging software service and web portal. WhatsApp is an American freeware, cross-platform messaging and voice service. Users can send text and voice messages, make voice and video calls, and share images, documents and other media. Facebook is an American online social media and social networking service.

ARTICLE HIGHLIGHTS

Research background

Coronavirus disease 2019 (COVID-19) was initially sparked in Wuhan, the capital of Hubei Province, and subsequently spread to the entire province and other parts of China, and then around the globe. Measures for effective control of outbreaks include identifying the causal organisms, applying appropriate therapies, and developing vaccines, as well as improving understanding among the general public.

Research motivation

COVID-19 has grown into a pandemic and may become endemic. Knowledge gaps always exist about disease epidemics, their potential risks, and the clinical spectrum.

Research objectives

We designed and conducted this survey to evaluate the knowledge, awareness, perception, and response of the general public to COVID-19 in China.

Research methods

A detailed questionnaire comprising 47 questions designed in both English and Chinese was developed. The survey was conducted *via* WeChat, a multipurpose messaging, social media, and mobile payment app that is widely used by the Chinese population. In total, 1006 participants responded from different provinces in mainland China.

Research results

Overall, this comprehensive survey revealed that the general public in China is highly aware of the basic information concerning COVID-19 and the necessary precautions. Interestingly, more respondents were aware of the term severe acute respiratory syndrome than COVID-19 and Middle East respiratory syndrome. The majority of the respondents indicated that knowledge about COVID-19 was received mainly from WeChat, followed by TV, friends, and QQ (a Chinese instant messaging software service).

Research conclusions

We comprehensively evaluated the knowledge, awareness, and perceptions about COVID-19 among the general Chinese population. The overall knowledge, awareness, and attitudes about the disease are at a high level, but strikingly, 2.8% of the participants in China were unaware of the current COVID-19 pandemic, which is unexpected.

Research perspectives

We emphasize the importance of initiating health promotion programs to educate the public and healthcare workers about infectious diseases in general for better preparedness for future epidemics and pandemics.

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