

# An Investigation on the Public's Acceptance of Prevention and Control Measures for COVID-19 in China

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## Research Article

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# Abstract

**Background:** China has basically succeeded in controlling the COVID-19 epidemic, which is due to the cooperation and acceptance of epidemic prevention measures by the public. However, few studies have examined the measures China has taken to combat COVID-19 in order to reflect on its success in curbing the the spread of epidemic.

**Methods:** In this study, the public acceptance questionnaire was designed based on the epidemic prevention measures adopted in China, to investigate the difference of public acceptance of epidemic prevention measures. The survey data was collected from 2,062 samples with different demographic characteristics from March 8, 2020 to April 9, 2020. And SPSS was used to analyze the data collected in the questionnaire, such as one-way variance, so as to draw conclusions.

**Results:** The results show that age and educational level have a significant influence on public acceptance. In contrast gender and occupation field has no significant impact on it. The acceptance of the emergency prevention and control measures taken by the government during the epidemic period is generally high. With the development of the epidemic, the acceptability is increasing. And the public acceptance of traffic measures was highest.

**Conclusions:** Rapid deployment of epidemic prevention measures and appropriate methods in transportation, economy and education are the key to China's effective containment of the epidemic. Measures such as shutting down cities and encouraging the wearing of masks deserve to be copied by other countries. This study summed up China's scientific experience in the fight against COVID-19 and differences in public acceptance. It can provide a positive reference for the development of epidemic prevention measures in other countries.

## 1. Introduction

The Coronavirus (COVID-19) pandemic is disrupting the world as we knew it, with a heavy toll on human lives and economic activities. The World Health Organization (WHO) has been listed as a "public health emergency of a global pandemic". China has successfully stopped the spread of the epidemic as the world's largest developing country, and the daily life of the public is gradually getting on the right track. At the same time, European countries had discussions in the early stages of the epidemic but did not consider crucial measures such as lockdown of entire cities, regions or countries [1]. Also, in some countries which are severely affected by the epidemic, some people and officials have different attitudes officials on epidemic prevention measures such as wearing masks and keeping a safe social distance, so that public even refuses to accept some epidemic prevention measures. Thus it can be seen, the public acceptance of epidemic prevention measures has become one of the most significant factors for the effective control of the epidemic. However, there is little research or literature on public acceptance of the measures taken to prevent and control the epidemic. The effectiveness of the prevention and control

measures taken by the government affects the development trend of the epidemic, and the public's acceptance of the measures is the most direct indicator of the effectiveness of the measures.

Acceptance refers to the degree of subjective recognition of a product, measure or regulation by its intended audience, which often reflects the usefulness of the product, measure or regulation from the side. Most of the acceptance studies are in the form of questionnaires to explore public attitude towards products or measures, which can be used to study people's views on emergency prevention and control policies during the epidemic period. Previous acceptance studies have used model validation and questionnaires as the most common forms of research in education, medicine, socioeconomic, science and technology applications, and new energy development. For example, in the social economy, the scholars investigated the relationship among personality traits, knowledge and attitude of GM agriculture use, and avoiding willingness to pay (WTP) for GM food by analyzing the relationship between personality characteristics and consumer behavior [2]. Abdulrahman, Duha and Victor's [3] research on the residents' acceptance determinants of smart city technologies is one of the first batches of empirical studies to determine the most influential factors of residents and civil servants' acceptance of smart city services; In the aspect of science and technology, previous scholars have studied the relationship between college students' acceptance of campus bikes and the influence of the built environment and shared bikes themselves [4], as well as that of the information contained in the tasting environment on the acceptance of artificially bred meat by participants of different ages and genders [5] in the form of questionnaires. Also, there were a large number of studies on the acceptance of new energy sources. Ziya, Can and Berrin [6] conducted a continuous explanatory survey to preliminarily assess the public acceptance of geothermal energy applications in the Canakkale region of Turkey. Tan, Gabrielle and Xu [7] conducted a study on public acceptance of shale gas application and development from different dimensions of public psychology. Caroline, Claudia and John [8] used the interview data of direct drinking water reuse project in five inland communities to analyze the factors affecting its acceptance. Susana [9] investigated the public acceptance of renewable energy technologies and related infrastructure and identified and discussed approaches for some future research. In general, most studies take perceived usefulness and perceived ease of use as study variables, and there are few COVID-19 related acceptance surveys at present.

Generally, there is a lack of research on the public acceptance of emergency prevention and control measures of COVID-19, and few articles have applied the acceptance research to the public's attitude towards the prevention and control of public health incidents. In terms of the development process of the epidemic, there are great differences in the acceptance of some emergency prevention and control measures in some countries with a severe epidemic. Therefore, public acceptance for the government and epidemic prevention policy is especially important. Based on above reasons, this article will start from acceptance, design and distribute the questionnaire according to COVID-19 epidemic prevention and control measures adopted in China, analysis of different types of COVID-19 emergency prevention and control measures to the acceptance of differences, explore how to develop rationally deal with public health emergencies prevention and control measures, to gain the experience, to deal with public health emergencies of public health emergency response to similar constructive significance.

## 2. Research Methods

At present, the existing literature has widely used questionnaire survey, literature review and other methods to investigate the public acceptance. Generally, a questionnaire survey is conducted to investigate the public acceptance of products or policies through random sampling. Therefore, this study summarized and optimized the scales of previous acceptance studies through literature review, and then designed a questionnaire on public acceptance of COVID-19 epidemic prevention measures in combination with the emergency prevention and control measures taken in various places during the outbreak of the epidemic in China from January to March 2020. The empirical data obtained in the form of a questionnaire survey, and then SPSS software was used to conduct descriptive statistical analysis and multiple comparative analysis to study the differences in acceptability between groups with different demographic characteristics.

### 2.1. Major Measure

Since the outbreak of COVID-19 in Wuhan China, relevant government departments have issued hundreds of relevant policy documents, including but not limited to measures and regulations on social isolation, traffic control, screening and testing, dynamic monitoring, diagnosis and treatment, resource allocation, material support and other aspects. China has adopted a unique anti-epidemic mode of complete isolation, combining its national nature and its political and social model. This paper extracts the various measures mentioned in each document and summarizes them as follows:

- Resolutely closing cities, villages, schools and factories, and isolating people from each other through complete isolation at the peak of the epidemic, thus fundamentally interrupting the transmission chain of the virus.
- Fully mobilizing the medical and health system to treat and cure the patients, and finally, achieve "full collection from receivables". Deploying the strongest Chinese and Western medical resources and experts to combine Chinese and Western medicine to minimize the number of deaths. Strengthening the guarantee of medical treatment costs for patients and ensuring that patients receive timely treatment.
- Quarantining close contacts, suspected cases and travellers in affected areas through various means, including hospital isolation, central isolation point isolation and home isolation.
- The government coordinated and mobilized medical resources, including the rapid construction of specialized hospitals and makeshift hospitals, and the organization of provincial and municipal medical and health systems to provide corresponding support to areas hit hard by the epidemic.
- Strengthening supervision of farmers' markets and control of wildlife, preventing internal proliferation and external export, urging the public to disperse rather than gather, minimizing public gathering activities, and avoiding the occurrence of clustered epidemics. Taking the strictest screening measures for febrile diseases and putting them under medical observation to prevent further spread of the epidemic.

- Citizens are advised to wash their hands regularly, maintain social distance, isolate infected people and ensure hospital capacity.
- Citizens are advised to avoid unnecessary travel activities. Citizens are advised to wear masks on public transportation and to enter and exit public places. People in public places should be equipped with temperature checkers and travel registration.
- Compulsory closure of kindergartens, primary schools, middle schools, universities, etc., all schools adopt online teaching mode. Enterprises and institutions adopt online office mode.
- During the epidemic period, the phenomenon of driving up prices, deceiving consumers and disturbing social and market order was severely punished. It is strictly prohibited to fabricate or disseminate false information about the development of the epidemic situation or emergency response.
- China's satellite TV stations have stepped up coverage of the epidemic and appropriately reduced entertainment programs.
- From January 23, 2020, to April 8, 2020, cordoning off the worst-hit areas, Wuhan, Hubei province.
- Since March 10, 2020, all provinces have gradually promoted the resumption of work, production and schooling to restore the order of production and life.

Also, corresponding countermeasures have also been taken against the negative impact of the epidemic:

- Implement economic stimulus policies and provide necessary social relief measures to prevent large-scale secondary disasters caused by unemployment, poverty and business closures.
- In the worst-affected areas, the necessary economic activities for the basic operation of society should be maintained as much as possible, while in the worst-affected areas, the normalization of economy and society should be taken into account as much as possible.

So far, these measures have played a positive role in China's fight against COVID-19. However, it is difficult to assess the hazard of COVID-19 in the early stage of the epidemic. So not all measures can be understood and coordinated by the public. Therefore, it is necessary to investigate the public acceptance of epidemic prevention measures.

## 2.2. Questionnaire Design

In this survey, based on the existing acceptance studies, combined with the characteristics of public health emergencies and the development of the epidemic, and according to the main epidemic prevention measures summarized in the previous section, the following variables are used to measure the public acceptance, which is specifically defined as follows:

- Epidemic awareness level: the degree of public understanding of the basic information of the epidemic situation, including the characteristics of the virus, the spread of the epidemic situation and other epidemic information.

- Measures acceptance: the public's understanding of the epidemic prevention and control decisions and the frequency of participation, as well as the public's subjective satisfaction with the decision after understanding the epidemic prevention and control decisions.
- Demographic characteristics: basic personal information such as gender, age, educational level, number of family members, etc.
- Traffic measures effectiveness: the extent and effect of traffic measures on epidemic prevention and control.
- Real economy type measures effectiveness: the extent and effect of real economy type measures on epidemic prevention and control.
- Educational measures effectiveness: the extent and effect of educational measures on epidemic prevention and control.
- Recreational activity measures effectiveness: the extent and effect of recreational activity measures on epidemic prevention and control.
- Other measures effectiveness: the extent and effect of other measures on epidemic prevention and control.

This study adopts the method of a questionnaire survey to conduct an empirical investigation. The questionnaire includes three parts: questionnaire description, basic personal information and the measurement of public acceptance of COVID-19 emergency prevention and control measures. This questionnaire selected major epidemic prevention and control measures to measure each variable according to *Notice on strict prevention of novel Coronavirus infection by vehicle* and *Notice on strengthening the prevention and control work of novel Coronavirus infected community* released by the State Council and other epidemic prevention and control documents.

In the design of the questionnaire, the basic information of the individual (BI) was a general multiple choices question, a total of 6 questions, marked as Bi-1, Bi-2... and so on. The public's acceptance of the novel Coronavirus emergency prevention and control measures was measured by Likert's five-point method (SC), namely, respectively in 1–5 represents "strongly inconsistent", "not quite consistent", "consistent", "quite consistent", "strongly consistent", a total of 6 questions, marked as Sc-1, Sc-2... and so on. See the appendix for a detailed overview of the items in the questionnaire.

## 2.3. Questionnaire Distribution

This study adopts the method of random sampling to conduct the survey. The survey is conducted in the form of an online questionnaire survey. All questionnaires are distributed and collected through the web-page version provided by The Questionnaire Star(<https://www.wjx.cn>). The questionnaire stated the purpose of the study and ensured the anonymity of the respondents. 2,101 questionnaires were recovered during March 8, 2020, to April 9, 2020, and 39 questionnaires were excluded as they did not meet the requirements. The number of valid questionnaires was 2,062, with an effective recovery rate of about 98.14%. Among the respondents, 48.74% were male ,and 51.25% were female. The age ranged between 16 and 60 years old, with 0.53% of adolescents under 18, 29.39% of young people between 18 and 25,

28.23% of young people between 26 and 30, 24.68% of middle-aged people between 31 and 40, 11.06% of middle-aged people between 41 and 50, 4.95% of middle-aged people between 51 and 60, and 1.16% of older adults over 60 years old. In terms of educational level, 2.91% have received junior high school education, 12.51% have received senior high school education, 26.24% have received junior college education, 50.53% have bachelor's degree, and 7.81% have master's degree or above.

In addition, the number of respondents from all regions of the country was relatively average, including a large number of people from the worst-hit areas, with 5.09% from Hubei province and 5.00% from Beijing. As for the occupations of the respondents, 21.58% are undergraduates or postgraduates, and 6.55% are engaged in finance and insurance.

In terms of gender, age, region, occupation and other dimensions, the sample has good randomness.

## **2.4. Data Analysis Method**

In this study, SPSS 22.0 (IBM, the United States), was used as a statistical analysis tool to process and analyze data. The proposed data analysis methods are mainly as follows:

### **2.4.1. Descriptive statistical analysis**

The descriptive statistical analysis mainly refers to the data obtained through the survey, which are grouped according to different regions, different times and different population characteristics, describing the distribution of various aspects of the population characteristics, and then making comparison on this basis. It includes the distribution of basic demographic characteristics, the distribution of public awareness of the epidemic and the distribution of public attitudes towards decision-making.

### **2.4.2. One-way analysis of variance (ANOVA)**

In the analysis of variance, certain characteristics of the object to be examined are called test indicators, and the conditions affecting the test indicators are called factors. Each factor has several states to choose from, and each state of the factors to choose from is called the level of the factor. If only one factor is changing during an experiment, it is called a single-factor experiment. This study analyzed the differences in attitudes of groups with different demographic characteristics (including gender, age, education level, number of family members, and occupation) towards all emergency prevention and control measures taken to respond to the development of COVID-19.

### **2.4.3. Multiple comparative analysis**

Multiple comparison is a method of comparing the mean of a population with equal variance. If the overall difference reaches a significant level in a certain factor, the multiple comparison method is used to test which groups have significant differences.

## **3. Results**

### 3.1. Understanding of the epidemic situation and attitude towards decision-making

To ensure the accuracy and effectiveness of the research data, the questionnaire collected the respondents' understanding of the epidemic situation and the prevention and control measures, to ensure that the respondents could correctly understand the effective degree of the epidemic prevention measures during the epidemic. Figure 1 shows the sample's understanding of the epidemic and attitude towards decision-making.

The following data indicate that most of the respondents in this study have a certain understanding of the nature of COVID-19 itself, a certain understanding of the severity of the virus and the epidemic, and have a certain concern and tracking of the development process of the epidemic, and are also aware of the severity of the epidemic and the difference among stages of its development.

Also, on the attitude to decision-making, The respondents differed in their judgment of the local government's disclosure of information on the specific situation of the epidemic and whether the emergency measures adopted were timely, effective and accurate, emergency prevention and control measures in different areas of the strength and ageing are different, which is widely distributed and diverse, so the population distribution of the sample is in line with the research needs.

### 3.2. The relationship between demographic characteristics and acceptance

In this part, some basic demographic characteristics such as gender, age, educational level and occupation field will be taken as independent variables, and public's acceptance of measures will be taken as dependent variables to verify the difference of measures with different characteristics through one-way ANOVA. The specific results are as follows:

**Table 1** One-way ANOVA for the correlation between gender and measures acceptance

Question number	Item	Sample size	M	SD	F	p
Sc-6	Male	1005	3.97	0.99	0.57	0.45
	Female	1057	4	0.97		
	Total	2062	3.99	0.98		
Sc-7	Male	1005	4.06	1.05	0.418	0.518
	Female	1057	4.03	1.02		
	Total	2062	4.05	1.04		
<b>Note:</b> * p < 0.05 ** p < 0.01						

It can be seen from the above table that the variance analysis is used to study the difference between genders in the public acceptance of measures and samples of different genders show no significant difference for both questions ( $p > 0.05$ ), which means that samples of different genders show consistency in the acceptance of measures, and there is no significant difference.

**Table 2** One-way ANOVA for the correlation between age and measures acceptance

Question number	Item	Sample size	M	SD	F <sub>(1)</sub>	p <sub>(1)</sub>
Sc-6	Below 18	11	3.55	1.13	1.962	0.068
	18 ~ 25	606	3.92	1.02		
	26 ~ 30	582	4.01	0.93		
	31 ~ 40	509	3.99	0.99		
	41 ~ 50	228	4.07	0.93		
	51 ~ 60	102	4.05	1.04		
	Above 60	24	4.42	0.83		
	Total	2062	3.99	0.98		
Sc-7	Below 18	11	3.27	1.27	4.403	0.000**
	18 ~ 25	606	3.95	1.01		
	26 ~ 30	582	4.09	1		
	31 ~ 40	509	4.02	1.1		
	41 ~ 50	228	4.13	1.04		
	51 ~ 60	102	4.27	1		
	Above 60	24	4.58	0.72		
	Total	2062	4.05	1.04		
<b>Note:</b> * $p < 0.05$ ** $p < 0.01$						

As can be seen from the above table, variance analysis was used to study the difference between age and public acceptance of measures and samples of different ages presented a significant difference for Sc-7 ( $P < 0.05$ ), indicating that samples of different ages had a difference in acceptance of measures. The specific analysis shows that respondents aged between 40 and 60 have a higher acceptance of measures than respondents of other age groups.

**Table 3** One-way ANOVA for the correlation between education level and measures acceptance

Question number	Item	Sample size	M	SD	F <sub>ij</sub>	p <sub>ij</sub>
Sc-6	Junior high school and below	60	4.15	1.02	4.609	0.001**
	High school	258	4.17	0.9		
	Junior college	541	4.03	0.91		
	Bachelor	1042	3.94	1.02		
	Master and above	161	3.84	0.99		
	Total	2062	3.99	0.98		
Sc-7	Junior high school and below	60	4.23	0.98	9.594	0.000**
	High school	258	4.26	1.01		
	Junior college	541	4.18	0.98		
	Bachelor	1042	3.94	1.06		
	Master and above	161	3.89	1		
	Total	2062	4.05	1.04		
<b>Note:</b> * p < 0.05 ** p < 0.01						

As can be seen from the above table, variance analysis was used to study the difference between educational level and public acceptance of measures and samples of different education level presented significant differences for SC-6 and SC-7 ( $P < 0.05$ ), indicating that samples of different educational level had differences in acceptance of measures. The specific analysis shows that respondents with a bachelor's degree or above are less receptive to the measures than respondents of other age groups.

**Table 4** One-way ANOVA for the correlation between career field and measures acceptance

Question number	Item	Sample size	M	SD	F <sub>ij</sub>	p <sub>ij</sub>
Sc-6	Agriculture	58	4.24	0.73	1.223	0.225
	Mining	38	3.97	0.88		
	Manufacturing	108	3.99	0.95		
	Water resources and hydropower	115	4.03	0.85		
	Real Estate	105	3.92	1.03		
	Modern logistics	120	4.08	0.89		
	Finance/Insurance	135	4.01	1.01		
	Information	128	3.98	0.92		
	Wholesale/Retail	93	3.92	0.98		
	Accommodation/Catering	97	3.89	1.06		
	Environmental and public utilities management	86	3.91	1		
	Leasing and business services	57	4.04	0.94		
	Residential service	50	3.7	1.27		
	Education	91	4.08	0.96		
	Recreation and entertainment	46	3.74	0.91		
	Medicine and health	80	4.08	0.92		
	Government departments and social organizations	51	4.06	0.99		
	Army/Police	23	4.04	1.11		
	Freelancer	74	3.7	1.11		
	Retired and housewife	62	4.1	1		
College or graduate students	445	4.02	1			
Total	2062	3.99	0.98			
Sc-7	Agriculture	58	4.34	0.87	0.953	0.518
	Mining	38	3.89	0.92		
	Manufacturing	108	4.1	0.91		

**Note:** \* p < 0.05 \*\* p < 0.01

Question number	Item	Sample size	M	SD	F <sup>□</sup>	p <sup>□</sup>
	Water resources and hydropower	115	4.01	1		
	Real Estate	105	3.92	1.15		
	Modern logistics	120	4.15	1		
	Finance/Insurance	135	3.99	1.1		
	Information	128	4.05	1.07		
	Wholesale/Retail	93	4.05	0.98		
	Accommodation/Catering	97	4.04	1.05		
	Environmental and public utility management	86	4.09	1.02		
	Leasing and business services	57	3.95	1.09		
	Residential service	50	3.86	1.21		
	Education	91	4.09	1.05		
	Recreation and entertainment	46	3.87	1.24		
	Medicine and health	80	4.22	1.06		
	Government departments and social organizations	51	4.12	1.09		
	Army/Police	23	3.74	1.01		
	Freelancer	74	3.96	1.16		
	Retired and housewife	62	4.18	0.97		
	College or graduate students	445	4.04	0.99		
	Total	2062	4.05	1.04		

**Note:** \*  $p < 0.05$  \*\*  $p < 0.01$

It can be seen from the above table that the variance analysis is used to study the difference between occupation areas in the public acceptance of measures and samples of different occupation areas show no significant difference for both questions ( $p > 0.05$ ), which means that samples of different occupation areas show consistency in the acceptance of measures, and there is no significant difference.

### 3.3. Analysis of the changing trend of public acceptance

In this study, 2,062 valid questionnaires were collected from March 8, 2020 to April 9, 2020. Presently The questionnaire data of 1148 questionnaires and 914 questionnaires collected in two time periods of solstice from March 8, 2020, to March 23, 2020, and solstice from March 23 to April 9, 2020, are respectively extracted for statistical analysis. Figure 2 and Fig. 3 respectively show the data distribution of sample data collected in Sc-6 and Sc-7 in the first half period. Namely the initial phase of the outbreak (later referred to as the early phase) and the second half period, namely the stable phase of the outbreak (later referred to as the late phase).

The data showed that the average scores of the two questions in the early phase were 3.92 and 3.95, respectively, which meant that the public had a high acceptance of the epidemic prevention and control measures. The average scores of the two questions in the late phase were 4.07 and 4.17, respectively, indicating that the public has a very high acceptance of various measures for epidemic prevention and control. During the epidemic, in general, the public has a high acceptance of social isolation, traffic control, screening and testing, dynamic monitoring, diagnosis and treatment, resource allocation, material support and other prevention and control measures. With the development of the epidemic, the trend of the epidemic has been gradually brought under control. China has become more proficient in the epidemic control, and the public's acceptance of the prevention and control measures has increased significantly.

### 3.4. Analysis of acceptance of different epidemic prevention measures

Various measures adopted by China have high public acceptance. The following is a case-by-case analysis of the public acceptance of some types of measures.

#### 3.4.1. Acceptance analysis of traffic measures

This paper analyzes the acceptance of traffic measures by the public, and the data is shown in the table below.

**Table 5** Acceptance of traffic measures

Question number	Strongly inconsistent	Not quite consistent	Consistent	Quite consistent	Strongly consistent	M
Sc-11	0.58%	1.55%	12.71%	31.23%	53.93%	4.36
Sc-12	0.68%	2.04%	14.45%	38.60%	44.23%	4.24
Sc-15	0.87%	3.83%	16.73%	29.58%	48.98%	4.22
M	0.71%	2.47%	14.63%	33.14%	49.05%	4.27

Traffic measures, as a unique anti-epidemic mode adopted by China in combination with its national nature and political and social mode, can best reflect the measures of complete isolation and isolation, which have higher public acceptance than other types of measures. This also shows that China can control the epidemic faster and more effectively than other countries with severe epidemics and the fully closed traffic control plays the most important role. The urban blockade of Wuhan, Hubei province, suppressed the spread of the epidemic in the first place.

With the development of the epidemic, and according to the epidemic situation of other western countries, measures such as traffic control are one of the most effective measures to curb the spread of COVID-19

### 3.4.2. Acceptance analysis of real economy measures

This paper analyzes the acceptance of real economy measures by the public, and the data is shown in the table below.

**Table 6** Acceptance of real economy measures

Question number	Strongly inconsistent	Not quite consistent	Consistent	Quite consistent	Strongly consistent	M
Sc-14	0.63%	2.67%	14.40%	37.97%	44.33%	4.23
Sc-16	1.89%	4.51%	15.42%	37.73%	40.45%	4.10
M	1.26%	3.59%	14.91%	37.85%	42.39%	4.17

The epidemic has had a huge negative impact on the country's economic development. Measures of the real economy are also necessary to minimize the damage and ensure the daily life of the public as much as possible. At the public level, to ensure the daily life of the public during the epidemic; At the national level, restore the national economy as soon as possible. As it is directly related to the daily life of the public, the public acceptance of this part of measures is also very high. The epidemic has dealt a huge blow to the real economy. As the epidemic has gradually cooled down, China has successively introduced policies and regulations to save the real economy.

### 3.4.3. Acceptance analysis of educational measures

This paper analyzes the acceptance of educational measures by the public, and the data is shown in the table below.

**Table 7** Acceptance of educational measures

Question number	Strongly inconsistent	Not quite consistent	Consistent	Quite consistent	Strongly consistent	M
Sc-19	0.53%	3.69%	15.71%	29.87%	50.19%	4.26
Sc-20	1.50%	7.03%	19.64%	36.95%	34.87%	3.97
M	1.02%	5.36%	17.68%	33.41%	42.53%	4.12

The severity of the epidemic in China comes at a time when school and university students are vacationing and the new semester is starting. Schools are responding to COVID-19 by delaying the start of classes and changing teaching patterns. Both the students themselves and their guardians have a high acceptance of such measures. It can be seen that the mode of postponing the opening of school and changing the teaching mode plays a great role during the epidemic. It can not only effectively control the spread of the epidemic, but also can not affect the development of education.

Now, the epidemic is cooling in China. Colleges all over the country have adopted semi-closed management to strictly prevent the outbreak of COVID-19 again. Meanwhile, they have updated their teaching mode and adopted a combination of offline and online methods to complete their education work, which has played an effective role in the prevention and control of the epidemic.

## 4. Discussion

### 4.1. Discussion of Results

Since the beginning of the COVID-19 pandemic, public health decision-makers have been called on to identify responses that are appropriate in intensity, duration, and scope [10], and the corresponding emergency prevention and control measures taken by the Chinese government have played a great role. Compared with the response to public health emergencies in the past, emergency prevention has always been the key link to prevent the epidemic from worsening and reduce the loss of the epidemic. By comparing the cost of treatment during a large outbreak of hepatitis A with that of prevention and control and prevention in advance, it was found that the cost of the latter was much lower than the former [11]. It should be noted that the results of this study showed that since the questionnaire was issued at the peak of the epidemic in China, the public had a poor risk perception on novel Coronavirus in the early stage of the epidemic and had negative emotions on the prevention and control of the epidemic at the early stage, so the public generally did not accept the government measures at the early stage of the epidemic. Moreover, theoretical prevention and control measures are prone to deviation when they are implemented in reality. Ajay and Bhargavi [12] believe that although in theory the advance prevention before the occurrence of an emergency is more beneficial, due to the impact of regional social concepts, cultural traditions and other factors, the advance prevention is difficult to implement in practice, resulting in the inefficiency of prevention. However, with the development of the epidemic, public acceptance has

gradually increased, which proves that the prevention and control measures taken by China are indeed positive and effective.

To contain COVID-19, full cooperation between the government and the public is essential. China has made comprehensive prevention and control measures from the perspectives of social isolation, traffic control, screening and testing, dynamic monitoring, diagnosis and treatment, resource allocation and material support. This study examines the effectiveness of these measures from the perspective of the public. This study, according to the construction of specialized hospital strengthen population medical treatment work measures such as public acceptance, diagnosis and treatment are one of the most important aspects of dealing with emergent public health events, Shwiff Katie and Aaron [13] showed that treating infectious diseases population can bring a broader economic benefits to the nation. Also, according to all kinds of people to traffic control measures such as high, traffic control measures such a real can effectively inhibit the spread of expansion, Jin, Lu, Ding, Chen and Peng's study of quantitative evaluation of the Wuhan city traffic control and centralized quarantine measures to control the action of COVID-19 outbreak, WuHan traffic control and centralized quarantine measures for disease control have a pretty good effect can provide a reference for other countries the epidemic prevention and control. At present, China has seen a significant reduction in the epidemic, while other severely affected countries have not seen any improvement. The implementation of measures such as traffic control and centralized isolation has become an important consideration for other countries to curb the epidemic.

The main purpose of this study is to design a questionnaire on public acceptance of government emergency prevention and control measures for COVID-19 that can be used to investigate public health emergencies, to investigate whether the emergency prevention and control measures taken by local governments of COVID-19 are timely, effective, and accepted and adopted by the public. The results of data analysis were used to explore whether there were significant differences in the acceptance of different groups to various aspects of government measures. This research data shows that, with the development of the outbreak, the public new crown outbreak risk perception is increased. The blockaded city, closed community management, extension work extension of school and take clear implementation of network teachings such as policy, our country's resistance to disease progress and orderly, increased acceptance of public emergency prevention and control measures to the government rate increases gradually. The timeliness and effectiveness of the government's emergency prevention and control measures have a direct impact on the development trend of public health events and the emergence and solution of livelihood issues. However, since the outbreak of the epidemic, China has constantly been groping in the development of the epidemic and has found the most effective means of prevention and control. In addition, there are differences among groups of different genders, ages, regions and occupations in terms of the level of education received, the degree of the grasp of real-time information on the Internet and the degree of attention paid to national health security. This difference is reflected in the public's acceptance of emergency measures for epidemic prevention and control during the epidemic period. People of different ages, regions and occupations have different receptivity to the measures, so they have different attitudes towards the development of the epidemic under the overall environment of weak public perception of the risk of the epidemic. At this time, relevant departments in different regions

should take effective and reasonable measures to cope with the development of the epidemic according to the characteristics and specific conditions of their jurisdiction.

## **4.2. Research contributions**

As an investigation and study during the COVID-19 epidemic, this study pays close attention to the development of the epidemic and analyzes the implementation of epidemic prevention and control measures from the perspective of the public, which is of profound significance to the prevention and control of the epidemic.

This study focus on one of the most important factors affecting the effective control of the epidemic: the public acceptance to the epidemic prevention measures, design the questionnaire from acceptance directions, explore the differences in the public's acceptance of the epidemic prevention measures adopted in China by different demographic characteristics, to further explore how to reasonably deal with public health emergencies prevention and control measures.

## **4.3. Lack of research**

Due to some limitations, this study still has some limitations in terms of research methods and research contents. This part will summarize and provide a reference for future researchers.

- 1) The questionnaire content of this study only considers common demographic characteristics such as gender, age and educational level. It ignores other demographic characteristics, such as whether they have experienced (participated in emergency protection) other public health events, etc. In the future, these factors can be added, so that specific measures can be better proposed for the government to issue recommendations, the results will be more accurate and detailed.
- 2) The questionnaire data obtained in this study are concentrated in different regions, so in future studies, the sample size can be increased to improve the diversity of samples and the proportion of average sample distribution.

## **5. Conclusion**

After investigating the COVID-19 control work report issued by various provinces and cities of China, this study summarized and collated the corresponding measures taken since the discovery of the epidemic, designed and distributed questionnaires, the following conclusions were drawn:

- 1) There was no significant difference in the cognition of measures between different gender and occupation groups; Respondents aged between 40 and 60 were more receptive to the measures than respondents of other age groups. Respondents with a bachelor degree or above were more receptive to the measures than respondents of other age groups.
- 2) The public has a high acceptance of emergency prevention and control measures on the whole. With the development of the epidemic, the acceptance has increased significantly under the comparison

between the government and relevant media and other countries with the severe epidemic.

3) All kinds of measures are highly accepted by the public, among which the traffic measures have the highest acceptance.

4) The anti-epidemic measures taken by the Chinese government have achieved remarkable results, and with the development of the epidemic, the public acceptance has gradually increased. Relevant measures can provide reference for other countries during the epidemic.

## Abbreviations

COVID-19: Coronavirus disease 2019; BI: basic information; SC: scale; ANOVA: One-way analysis of variance

## Declarations

### Ethics approval and consent to participate

Not applicable.

### Consent for publication

Not applicable.

### Availability of data and materials

Not applicable.

### Competing interests

The authors declare that they have no competing interests.

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### Authors' Contributions

ZA conducted the research, wrote the paper, collected and analyzed the basic data; WX conceived the key ideas and the system architecture; GJQ checked and polished the language; ZYB reviewed the process.

### Acknowledgments

Not applicable.

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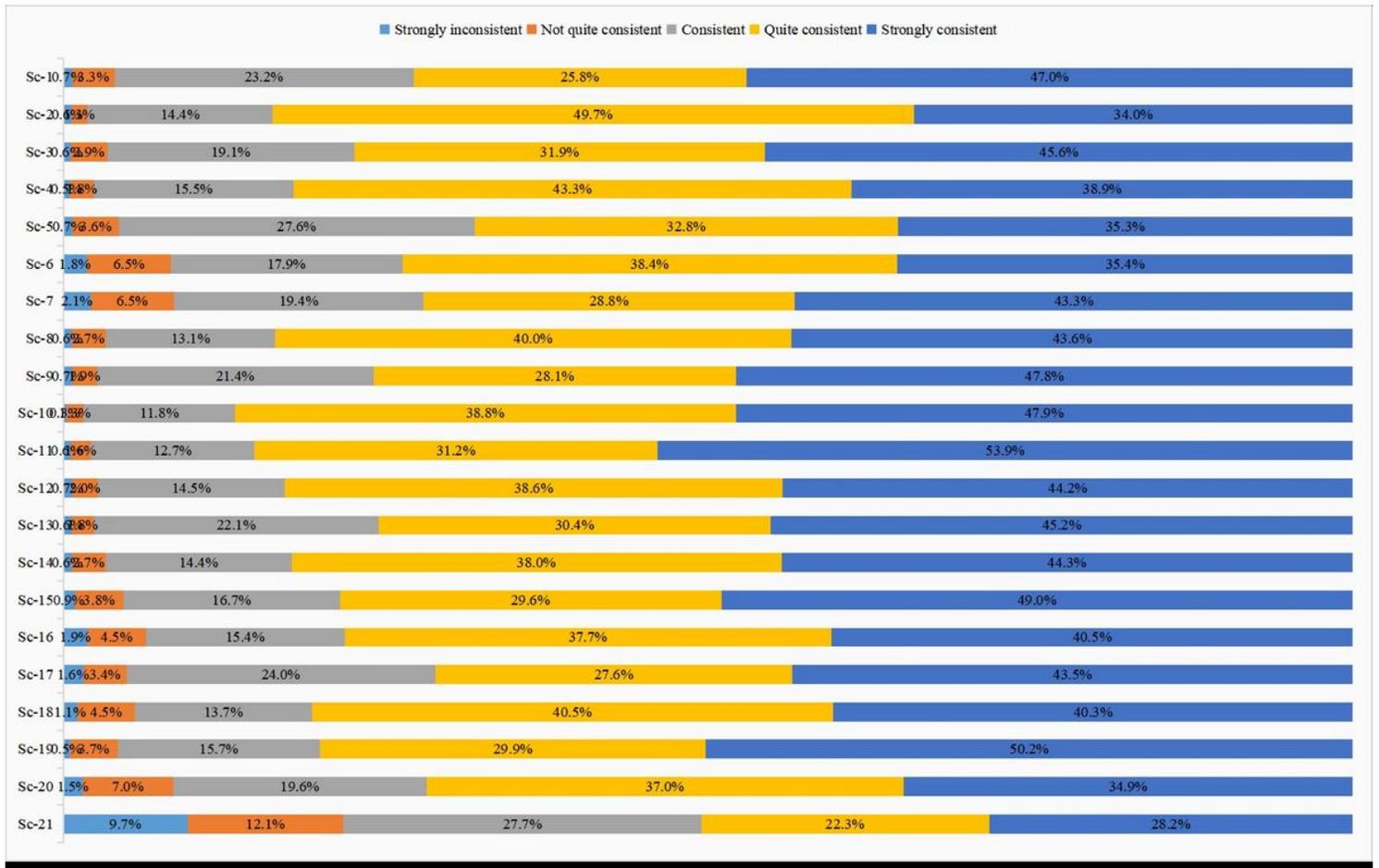
## Appendix

Public acceptance of COVID-19 preparedness measures questionnaire

<b>Research variables</b>	<b>Question number</b>	<b>Question of measurement</b>
Demographic characteristics	Bi-1	Gender?
	Bi-2	Age?
	Bi-3	Level of education (including ongoing)?
	Bi-4	Place of residence?
	Bi-5	Number of family members (including yourself)?
	Bi-6	Occupational area?
Epidemic awareness level	Sc-1	I know a lot about the symptoms of COVID-19.
	Sc-2	I know a lot about how COVID-19 is transmitted.
	Sc-3	I know a lot about prevention measures for COVID-19.
	Sc-4	I know a lot about cases of COVID-19 infection.
Measures acceptance	Sc-5	I know a lot about the emergency measures taken by my local government.
	Sc-6	I believe that my local government is timely and accurate about the specific situation of the epidemic.
	Sc-7	I think it is timely for my local government to take emergency prevention and control measures.
Traffic measures effectiveness	Sc-11	I believe that city closures are important to the prevention and control of the epidemic.
	Sc-12	I believe that the closed management of the community plays an important role in the prevention and control of the epidemic.
	Sc-15	I believe that traffic control measures (such as banning the passage of motor vehicles) play an important role in the prevention and control of the epidemic.
Real economy measures effectiveness	Sc-14	I believe that delayed resumption of work and post-resumption of protection (health monitoring, etc.) play an important role in the prevention and control of the epidemic.
	Sc-16	I believe that controlling the price increase of epidemic prevention products and basic daily necessities plays an important role in epidemic prevention and control.
Educational measures effectiveness	Sc-19	I believe that the postponement of school opening has played an important role in the prevention and control of the epidemic.
	Sc-20	I think the adoption of online teaching in schools has played an important role in the epidemic.
Recreational activity	Sc-13	I believe that limiting or stopping crowd gathering will play an important role in epidemic prevention and control.

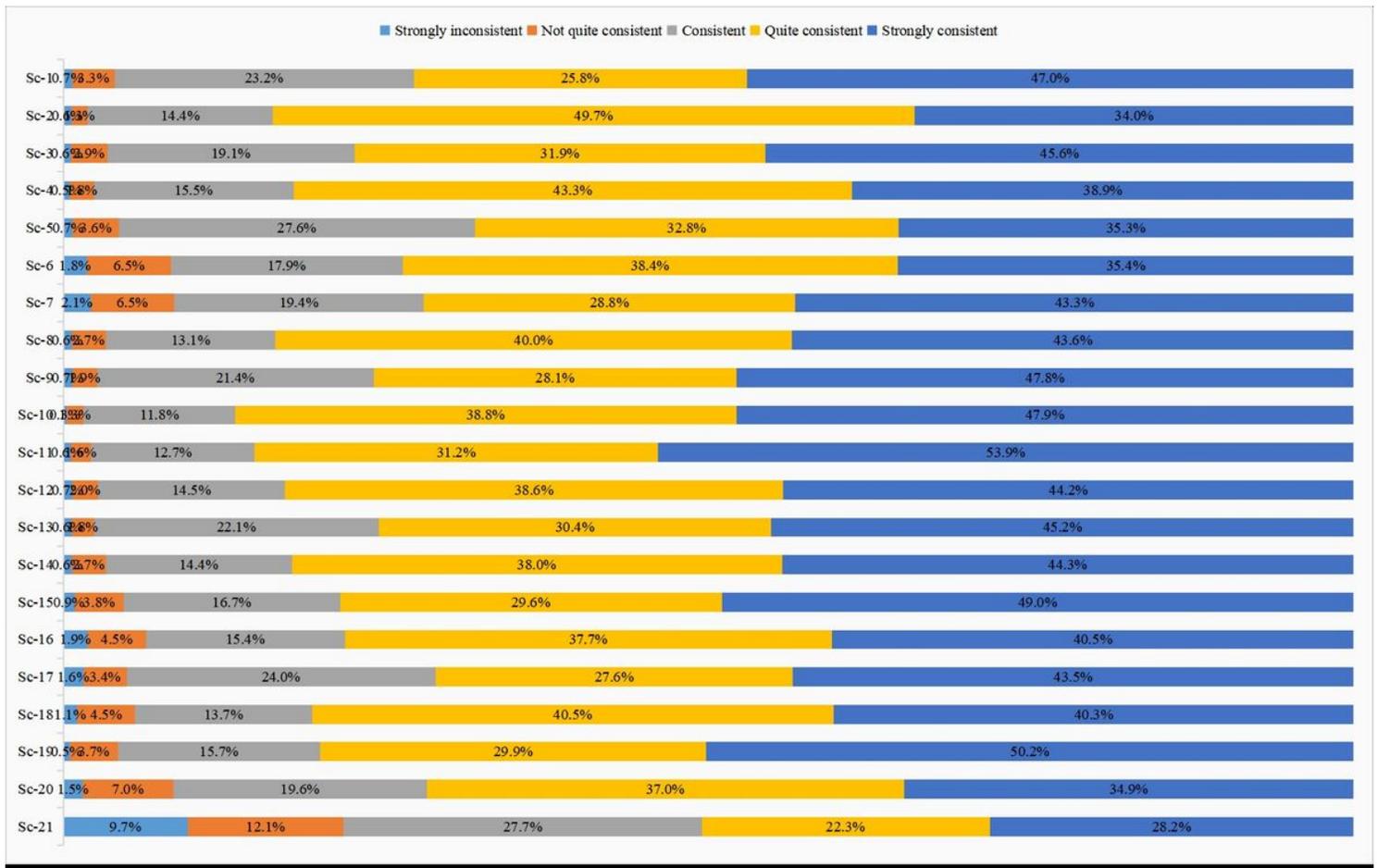
Research variables measures effectiveness	Question number	Question of measurement
	Sc-21	I believe that reducing entertainment programs will play an important role in the prevention and control of the epidemic.
Other measures effectiveness	Sc-8	I believe that publicly confirming the trajectory of patients is important for epidemic prevention and control.
	Sc-9	I believe that disclosure of personal protective measures is important for epidemic prevention and control.
	Sc-10	I think the construction of special hospitals (Raytheon hospital, Vulcan Hospital, etc.) will play an important role in the prevention and control of the epidemic.
	Sc-17	I believe that the punishment of concealment, delay and false reporting of the epidemic situation will play an important role in the prevention and control of the epidemic.
	Sc-18	I believe that strengthening the punishment for spreading rumors during the epidemic will play an important role in the prevention and control of the epidemic.

## Figures



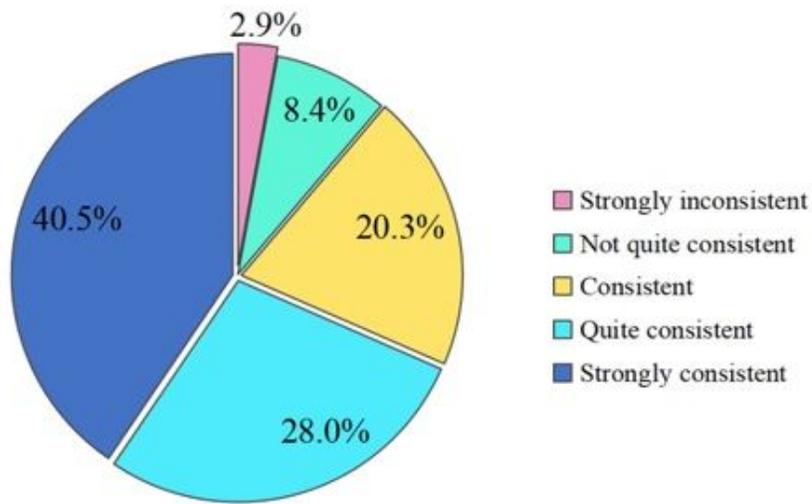
**Figure 1**

The sample's understanding of the epidemic situation and attitude towards decision-making Fig 1 is the bar chart of the respondents' acceptance of various measures. The light blue bar represents the people who are strongly inconsistent to this measure, the orange bar represents the people who aren't quite consistent to this measure, the grey bar represents the people who are consistent to this measure, the yellow bar represents the people who are quite consistent to this measure, and the dark blue bar represents the people who are strongly consistent to this measure.

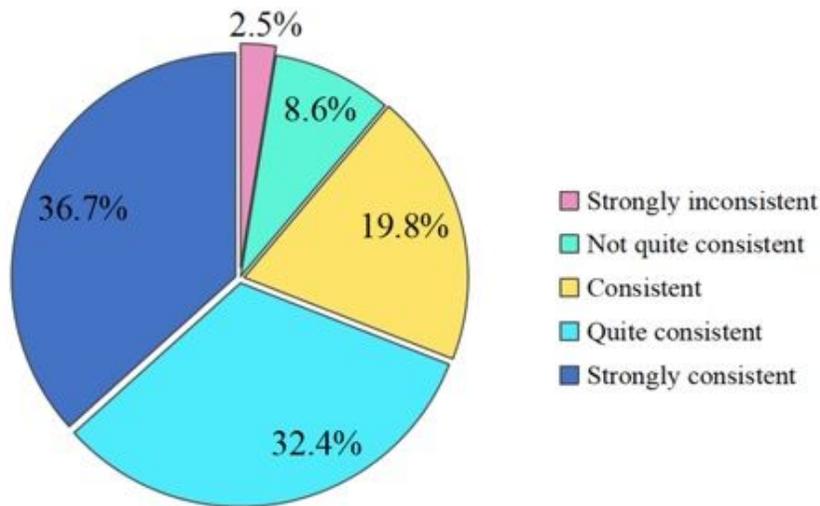


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(a)

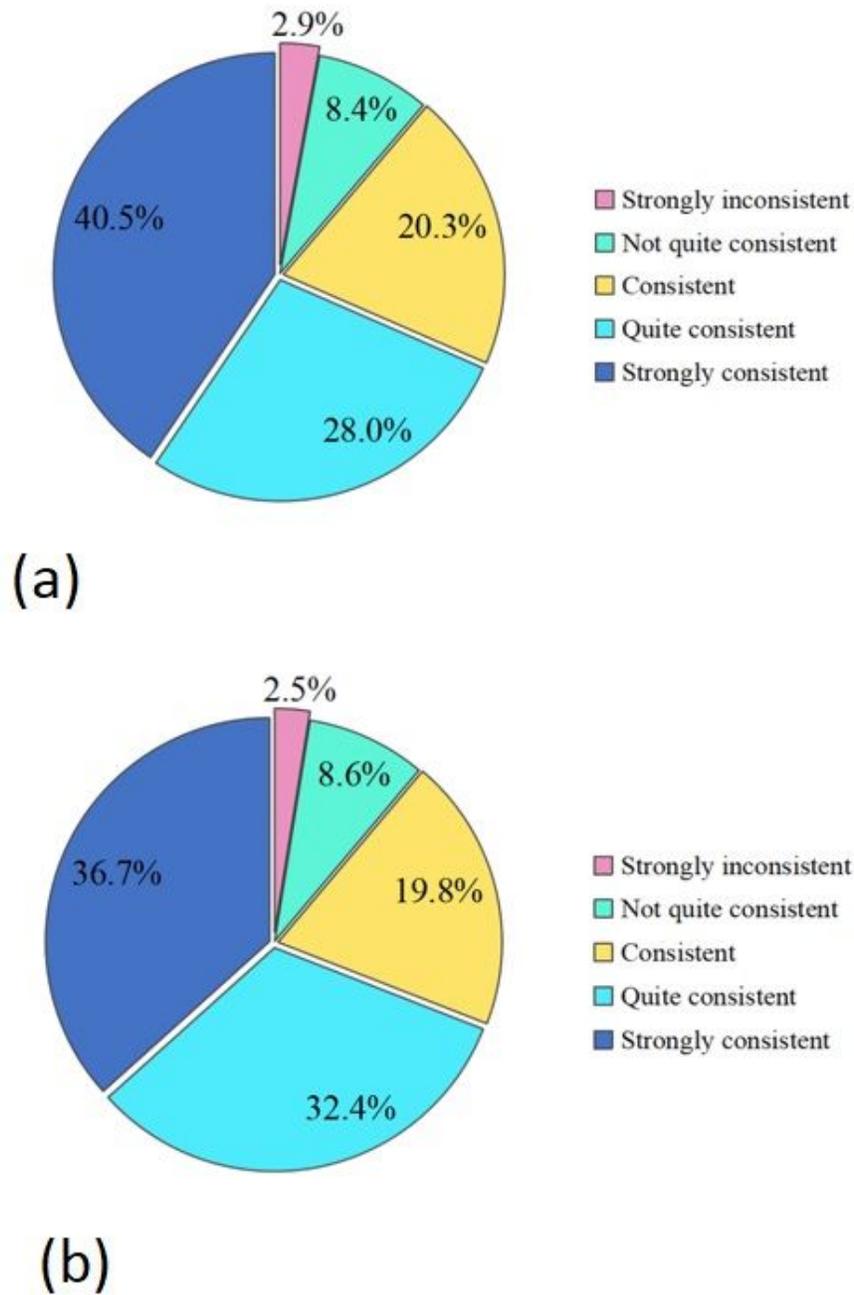


(b)

**Figure 2**

Pie chart of public acceptance of epidemic prevention and control in the early phase (March 8, 2020, to March 23, 2020) (a) Pie chart of public acceptance of epidemic information disclosure in the early phase (b) Pie chart of public acceptance of implementation of emergency prevention and control measures in the early phase. Fig 2 is the pie chart of public acceptance of epidemic prevention and control in the early phase (March 8, 2020, to March 23, 2020). The pink pie represents the people who are strongly inconsistent to this measure, the green pie represents the people who aren't quite consistent to this measure, the yellow pie represents the people who are consistent to this measure, the light blue pie

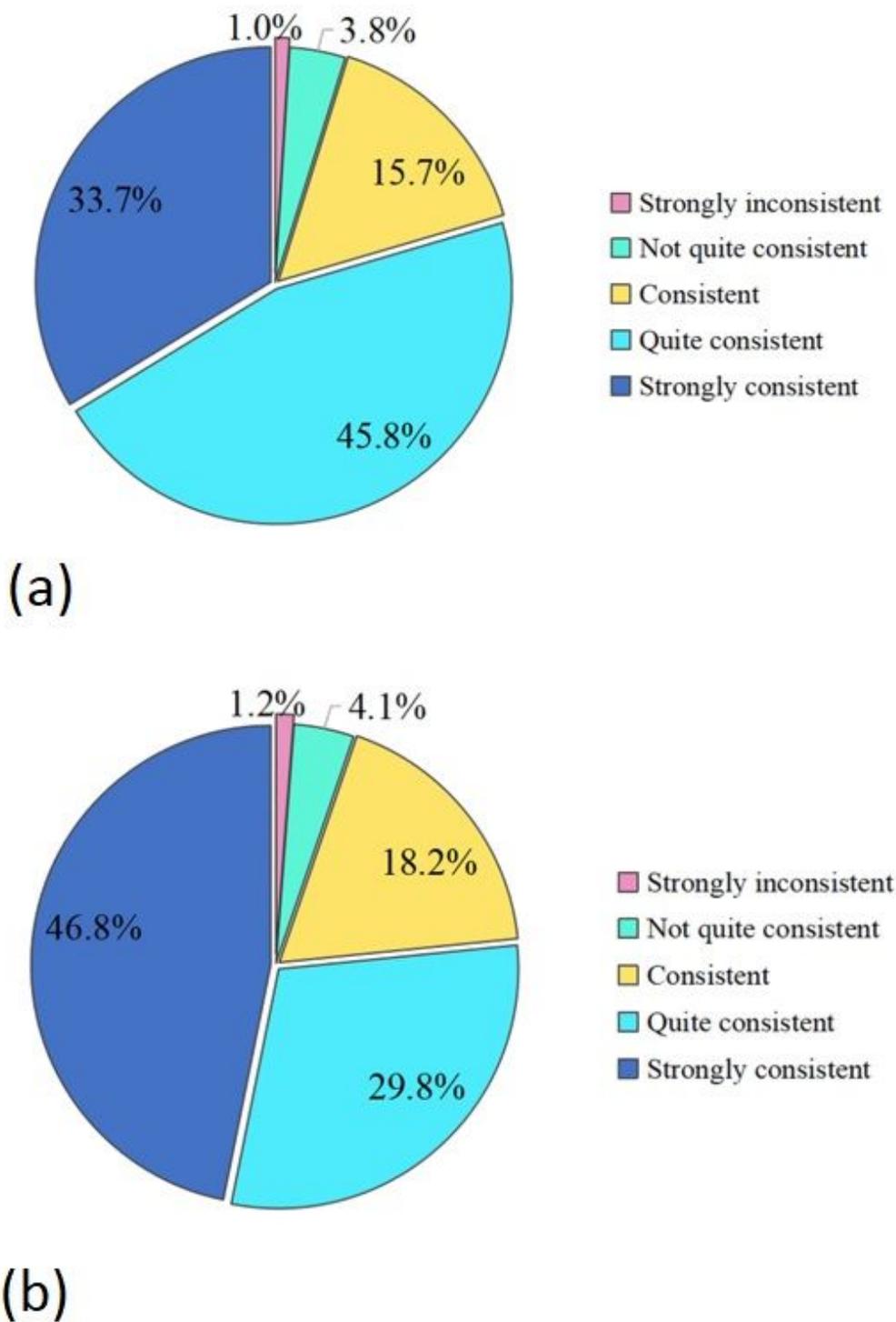
represents the people who are quite consistent to this measure, and the dark blue pie represents the people who are strongly consistent to this measure.



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Pie chart of public acceptance of epidemic prevention and control in the early phase (March 8, 2020, to March 23, 2020) (a) Pie chart of public acceptance of epidemic information disclosure in the early phase (b) Pie chart of public acceptance of implementation of emergency prevention and control measures in the early phase. Fig 2 is the pie chart of public acceptance of epidemic prevention and control in the early phase (March 8, 2020, to March 23, 2020). The pink pie represents the people who are strongly inconsistent to this measure, the green pie represents the people who aren't quite consistent to this

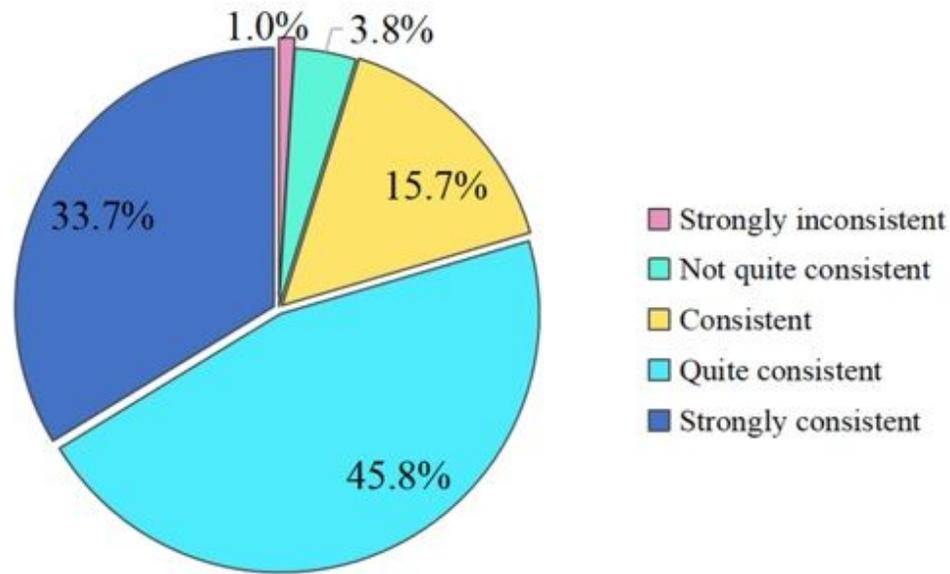
measure, the yellow pie represents the people who are consistent to this measure, the light blue pie represents the people who are quite consistent to this measure, and the dark blue pie represents the people who are strongly consistent to this measure.



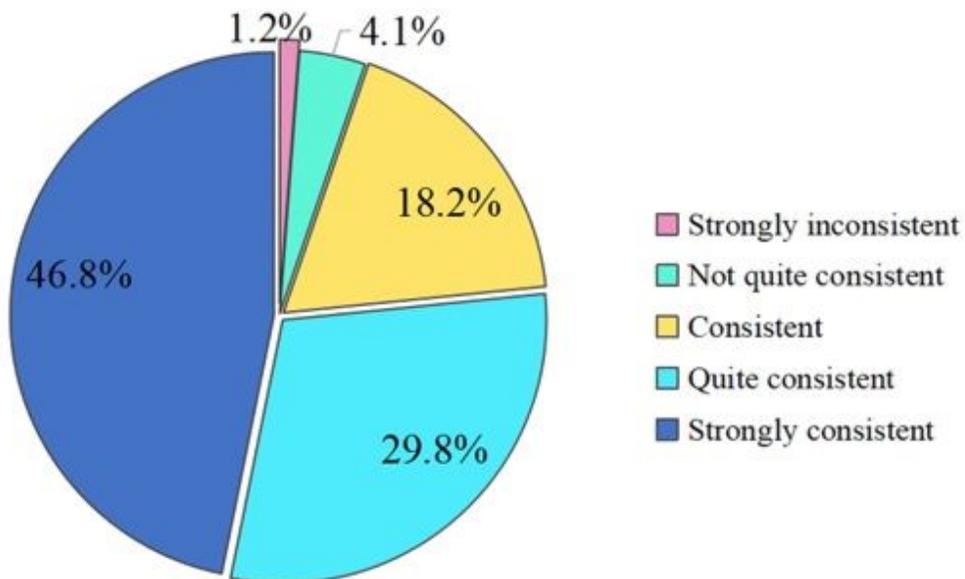
**Figure 3**

Pie chart of public acceptance of epidemic prevention and control in the late phase (March 23, 2020, to April 9, 2020) (a) Pie chart of public acceptance of epidemic information disclosure in the late phase (b) Pie chart of public acceptance of the implementation of emergency prevention and control measures in

the late phase. Fig 3 is the pie chart of public acceptance of epidemic prevention and control in the late phase (March 23, 2020, to April 9, 2020). The pink pie represents the people who are strongly inconsistent to this measure, the green pie represents the people who aren't quite consistent to this measure, the yellow pie represents the people who are consistent to this measure, the light blue pie represents the people who are quite consistent to this measure, and the dark blue pie represents the people who are strongly consistent to this measure.



(a)



(b)

Figure 3

Pie chart of public acceptance of epidemic prevention and control in the late phase (March 23, 2020, to April 9, 2020) (a) Pie chart of public acceptance of epidemic information disclosure in the late phase (b) Pie chart of public acceptance of the implementation of emergency prevention and control measures in the late phase. Fig 3 is the pie chart of public acceptance of epidemic prevention and control in the late phase (March 23, 2020, to April 9, 2020). The pink pie represents the people who are strongly inconsistent to this measure, the green pie represents the people who aren't quite consistent to this measure, the yellow pie represents the people who are consistent to this measure, the light blue pie represents the people who are quite consistent to this measure, and the dark blue pie represents the people who are strongly consistent to this measure.