

# People's perception of quarantine during the COVID-19 outbreak in Shantou, China

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## Research article

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# Abstract

## Background

Unprecedented public health measures have been implemented to combat the pandemic outbreak of the 2019 coronavirus disease (COVID-19) in China. The purpose of this research is to identify people's perception of quarantine during the COVID-19

## Methods

Semi-structured interviews with 30 participants were conducted, including 15 people who had been quarantined and 15 participants who had not been quarantined during the COVID-19 outbreak in Shantou, Southern China. Interview data were collected from February to March 2020. All interviews were audio-recorded and transcribed verbatim. The transcribed data were coded and analyzed to identify key themes.

## Results

Four key themes concerning public health measures emerged: 1) A city-wide lockdown effectively aroused the public's awareness of the seriousness of COVID-19, which was helpful for controlling the pandemic; however, it greatly impacted the economy and individuals' way of life. 2) Hotel quarantine was an effective measure for medical observations. 3) Fear and lack of knowledge of quarantine were the main factors that affected quarantine compliance. 4) Less attention was paid to people's mental health during the pandemic outbreak.

## Conclusions

A lockdown and centralized hotel quarantines were effective ways to control the outbreak. Mandatory measures were highly supported. The media should educate the public about COVID-19. Psychological counseling is necessary for people who were quarantined long-term. The findings have implications for other countries and for emerging infectious diseases in the future.

## Background

In December 2019, there were several patients with an unknown pneumonia in Wuhan, China. It was soon confirmed that the disease was caused by COVID-19 [1]. Epidemiological investigations suggest that this virus is spread by person-to-person transmission, causing a global health emergency [2–4]. The government of Wuhan shut down all public transportation and a city-wide lockdown commenced on January 23, 2020. However, more than five million residents already left and many of them were infected, which led to the disease being spread across China and other countries [5]. By January 30, COVID-19 was declared a public health emergency of international concern. A total of 113,579 close contacts had been

tracked and received medical observation by February 2[5]. Like other severe acute respiratory syndromes coronavirus (SARS-CoV), most severe patients were symptomatic and identifiable, which make quarantining successful[6]. However, some patients infected with COVID-19 were asymptomatic and could spread the virus to other during its incubation period[7]. By February 28, more than 82,000 confirmed cases of COVID-19 had been declared, with more than 2,800 deaths across 46 countries[8]. To control the spread of COVID-19, unprecedented public health measures were implemented, including a city-wide lockdown, quarantining ill persons, and social distancing.<sup>5</sup> To effectively quarantine infected individuals and reduce the spread of the pandemic, the Shantou government restricted anyone symptomatic in the pandemic area of Hubei province from having close contact with others for 14 days. Further, when other people were present, each of them must wear masks. Despite the positive effects of the quarantine, some residents were not compliant with the protective measures. The aim of this study is to understand people's perception and experience of the COVID-19 quarantine providing some suggestions for the improvement of public health measures for future contagious diseases or the same outbreak in other countries.

## Methods

### Study sample

Included individuals were those who currently lived in the downtown area of Shantou. Participants were informed of the study purpose. Thirty-two individuals completed interviews after being recruited through purposive sampling in February–March 2020. One quarantined participant was not strictly quarantined and thus removed from the study. In the non-quarantined group, two people had the same occupation; therefore, we only chose one of them. Finally, 30 individuals were interviewed, including 15 who had been isolated or quarantined (quarantined group) and 15 participants who were not (non-quarantined group). Participants' characteristics are shown in Table 1.

Table 1  
Participants' demographic characteristics

No.	Age (years)	Profession	Education level	Marital status	Time and place of quarantine
1	31–50	Patient	Junior high	Married	Eight days in a hotel; then, 12 days in a hospital. Currently quarantined at home (day 7)
2	31–50	Patient	Senior high	Married	Three days in a hotel; then, 12 days in a hospital. Currently quarantined at home (day 4)
3	0–30	Patient	Bachelors	Married	Fourteen days in a hotel; then, 12 days in a hospital. Currently quarantined at home (day 2)
4	0–30	Patient	Bachelors	Married	Currently quarantined in a hospital (day 25)
5	31–50	Nurse	Bachelors	Married	Currently quarantined in a hospital (day 25)
6	31–50	Nurse	Masters	Married	Currently quarantined in a hospital (day 25)
7	31–50	Nurse	Bachelors	Married	Currently quarantined in a hospital (day 28)
8	31–50	Physician	Masters	Married	Currently quarantined in a hospital (day 23)
9	0–30	Physician	Masters	Single	Currently quarantined in a hospital (day 21)
10	31–50	Physician	Masters	Married	Currently quarantined in a hospital (day 31)
11	> 50	Cleaning staff	Primary	Married	Currently quarantined in a hospital (day 28)
12	0–30	Medical observer	Bachelors	Married	Three days in a hotel; then, 14 days in a hospital. Currently quarantined at home (day 8)
13	0–30	Medical observer	Bachelors	Single	Fourteen days in a hotel; then, three days in a hospital.
14	31–50	Medical observer	Doctoral	Married	Eleven days at home; then, 11 days in a hotel
15	> 50	Medical observer	Junior high	Married	Fourteen days in a hospital
1	31–50	Hospital executive	Doctoral	Married	None

No.	Age (years)	Profession	Education level	Marital status	Time and place of quarantine
2	31–50	Driver	Senior high	Married	None
3	31–50	Student	Doctoral	Married	None
4	> 50	Stevedore	Junior high	Married	None
5	31–50	Nurse	Bachelors	Married	None
6	31–50	Physician	Masters	Married	None
7	31–50	Infection management	Masters	Married	None
8	31–50	Nurse	Bachelors	Married	None
9	0–30	Hotel manager	Bachelors	Married	None
10	31–50	Teacher	Bachelors	Married	None
11	> 50	Doctor	Bachelors	Married	None
12	31–50	Journalist	Bachelors	Married	None
13	31–50	Cosmetologist	Junior high	Married	None
14	0–30	Salesman	Bachelors	Married	None
15	0–30	Student	Bachelors	Single	None

## Data collection

A qualitative research design involving semi-structured in-depth interviews was adopted. Participants were clearly told that they had the right to refuse to answer any questions and withdraw from the study any time. To ensure privacy, participants remained anonymous. All participants provided written consent.

Most interviews were conducted over the phone to reduce the risk of infection. Four participants completed face-to-face interviews with the protection of masks. With participants' permission, all interviews were audio recorded and transcribed verbatim. The interview format allowed participants to speak freely. To ensure interview quality and consistency, one author conducted all interviews. The interview began by asking participants for basic information; describing their perception of the city lockdown, quarantining ill persons, the population's willingness to comply with the quarantine, and the facilitating factors and barriers associated with quarantine; and more specific questions about their personal experiences. Each interview lasted 30 to 50 minutes

## Data analysis

A phenomenological approach was adopted to analyze the interview data. Each interview was independently transcribed verbatim and read several times by two authors to identify recurring patterns and their links to the theoretical framework[9]. Disagreements were resolved by group discussion. The transcribed data were coded and analyzed following the grounded theory approach to identify recurring patterns and create an explanatory framework[10, 11] Interview transcripts were repeatedly read by the research team.

## Results

Four key themes were identified: city-wide lockdown was effective, a hotel quarantine was effective, fear and lack of knowledge of quarantine were the main factors that affected quarantine compliance, and insufficient attention was paid to people's mental health.

First, all participants described their perceptions of the lockdown of Wuhan city. They all agreed that the decision was very wise and necessary. It was unprecedented and caused a widespread panic; however, it was very helpful to try and prevent the pandemic and protect people outside of the city. Two respondents commented on the specific timing of the lockdown:

When I heard the news that Wuhan was [on] lockdown...I realized the serious of the problem and felt a little scared—hoping not to spread to my hometown in Shantou...It would be better if the decision [was] made earlier...the media reported that about 5 million people [that] used to live in Wuhan had left the city, and many of them may [have] already been infected, which lead to a further spread.

—doctoral student, non-quarantined group

I greatly appreciate and support the government's decision...However, people in Wuhan made great sacrifices since this measure could accelerate the spread of the virus inside...However, in order to control the epidemic, we have no choice but [to] cut off the source of infection. To our relief, all kind of supports, including medical supplies, medical workers, and food from different directions quickly arrived [in] Wuhan.

—hospital executive staff, non-quarantined group

Most patients in the quarantined group expressed that they felt surprised when hearing the news of the lockdown since they had not seen much media coverage about it. However, two doctors working in a hospital were not surprised.

Everything seems normal in Wuhan...people working and living as usual before we [got] on the train. We saw the workers in the railway station wear[ing] masks and passengers [wore] masks too. The staff measured our temperature when we got off the train. Two days later, we were told to be quarantined because we came from Wuhan; although, we didn't have any symptoms. I feel lost about what happened.

—medical observer, quarantined group

I didn't feel any surprise[e] about the decision made by [the] government. There already had [been] thousands of cases confirmed and [many] more suspicious cases waiting for laboratory [results from] Wuhan. This situation is really terrible. Locking down the city is necessary for reducing the virus spread, which directly cut[s] off the source of infection and prevent[s] more people from being infected.

—physician, quarantined group

Shantou was locked down like Wuhan; however, there were only two confirmed cases of COVID-19. The participants held negative attitudes toward this decision. Most participants indicated that, although the primary purpose was understandable, it really caused panic.

The primary purpose of [the] government is to protect residents in Shantou from [the] COVID-19 attack. However, this measures cause[d] a series of panic—many residents went to supermarkets to buy food without wear[ing] [a] mask, which could accelerate the spread of the virus in such [a] closed environment.

—nurse, quarantined group

Second, many medical observations were conducted as patients were quarantined in hotels and provided with free accommodation and meals. All participants appreciated this action by the government. Being quarantined in a hotel is better than at home, as the amount of contact with others can be better controlled.

*"Living in [a] hotel is quite comfortable. Hotel attendants bring meals to the front of my door and monitor [my] temperature for me twice a day. Except that I can't go outside of the room. I can do many things in the room—communicate with my friends and families, watch TV, and surf the Internet."*

—undergraduate student, quarantined group

Hotel quarantine is a good option...but we need [to] distinguish the situation of different people. I quarantined at home with my family for 11 days and then [I was] informed to [quarantine at the] hotel for another 3 days. It doesn't make much sense for me. There is no need to shift to [a] hotel as long as you don't go outside [and come in] contact with other people.

—physician, quarantined group

Compared with hospital quarantine, people without symptoms would prefer stay in a hotel, which was more convenient and caused less stress.

*"I was quarantined in a hotel for 14 days without any symptom[s] and a medical worker took a pharyngeal swab for me until the last day. The test [was] positive, and I was quickly transferred to the hospital for isolation and treatment. Compared with the hospital, the environment of [the] hotel is really comfortable."*

—diagnosed patient, quarantined group

If I have to be quarantined without any symptoms, I'd rather go to [a] hotel than [the] hospital. There were so many cases confirmed in [the] hospital. I'm afraid of being infected by other patients...However, if I have a fever or other discomfort, I would turn to [the] hospital.

—undergraduate student, non-quarantined group

People quarantined in a hotel may have a higher risk of infection; therefore, it is necessary to examine individuals at the beginning and at the end of their quarantine:

...The result[s] of several tests indicated that I [was not] infected [with] COVID-19. Then, I was asked to quarantine in a hotel. My wife [who tested positive for COVID-19] was sent to [a] hospital for isolation and treatment. I also had three tests during the 14 days {I was} quarantined.

—medical observer, quarantined group

Third, although all patients, physicians, and nurses in the quarantined group stated that they were voluntarily quarantined, some medical observers were resistant to the quarantine:

All the result[s] of laboratory testing showed [that] I [had] a common fever and didn't [acquire] the virus. However, I was asked to quarantine in [the] hospital immediately since my ID card showed that I came from the province of Hubei. I ha[d] no choice but [comply]. I wouldn't go to the hospital if I knew [I] needed to be quarantined. Life quarantined in the hospital was boring and depress[ing].

—medical observer, quarantined group

I feel the government and doctors [kept] a lot of things from me, which [made] me feel panic and [needing] more information. Life quarantined in [the] hospital is very inconvenient and depress[ing]. People refuse quarantine for fear of the unknown life. They [are] afraid [of the costs or being] discriminated [against] by people around them. The medical institution should strengthen education and communication with them.

—patient, quarantined group

Participants in the non-quarantined group indicated that they would quarantine if necessary:

If there [was] any suggestion that I [had] contact with [infected] patients and need[ed] to be quarantined...I would pick up my luggage immediately and prepare for quarantine and keep distance [from] my families. However, I would not be willing to quarantine if I didn't [think I was] exposed.

—patient, non-quarantined group

[Compliance] is a duty for a citizen, which is just not about one person, but the whole society. Wearing mask[s] and active quarantine need to be respected. [The] media and government should increase publicity.

—medical observer, quarantined group

Lastly, concerning participants' mental health, only one participant in the quarantined group had undergone psychological testing. Two participants in the non-quarantined group had completed psychometric measurements for scientific research. All participants in the non-quarantined group reported they did not need psychological counseling and the participants who were quarantined in hospital or hotel psychological interventions should be available if needed.

This outbreak makes me feel shock and I didn't take any psychological tests. I can adjust by myself and I don't think I need psychological counseling. Participants who were quarantined maybe need



psychological counseling; especially the first line of medical staff—their experiences and emotions might directly affect patients.

—infection management staff, non-quarantined group

All the physicians in the quarantined group indicated that they did not need psychological counseling. Some nurses indicated that proper psychological counseling may help reduce stress. Most quarantined participants believed that a longer isolation period would likely result in increased agitation. In addition, some participants reported being verbally abused and discriminated against. Some media reported that Chinese students and tourists in other countries were also subjected to racist behavior and hate crimes across the world.

We didn't need psychological counseling and we always encourage[d] each other. My family [is] very supportive of my work—they told me to protect myself. In addition, this is our responsibility and all of us [are] professionally trained. However, patients may need psychological counseling, especially those isolated for [a] long time.

—physician, quarantined group

When entering the isolation ward, I always feel very anxious [and I am] afraid of drinking water. Once you put on the protective clothing [and] enter the isolation zone, you can't go to the bathroom until [you] complete [the] work. I have finished the psychological test and the result[s] showed that I have mild stress. Proper psychological counseling is necessary.

—nurse, quarantined group

## Discussion

The in-depth interviews discussed in this study provide participants' perceptions and experiences about quarantine in China during COVID-19. In the recent years, several viral epidemics such as the SARS-CoV, H1N1 influenza, and the Middle East respiratory syndrome coronavirus (MERS-CoV) struck different parts of the world[12]. Initial public health measures of the outbreak relied heavily on quarantine. We can thus learn many lessons from the previous outbreaks to prevent the spread of COVID-19.

The classic public health measures that were implemented included quarantine and isolation, social distancing, and community containment[5]. A city-wide lockdown was unprecedented in China. While the participants agreed with the lockdown of Wuhan, they felt the situation in Shantou was not dire enough to warrant a lockdown, and that it negatively affected social stability and urban economies[13, 14]. Research also demonstrates that sheer population size is the biggest challenge for a owing to a shortage of hospital beds[8]. Strong measures taken to restrict the spread of a deadly disease inevitably cause considerable collateral damage[15]. The government had to balance the pros and cons, such as economic losses against the need to contain the spread of a deadly disease, before making the decision. Other countries may benefit from these decision-making processes if they too experience a COVID-19 outbreak.

Quarantine is one of the most effective measures of controlling communicable disease outbreaks, which was implemented successfully during the SARS epidemic in 2003[16]. Individuals can be quarantined at home or in a designated facility such as a hotel, cruise ship, or hospital[17]. However, an ineffective quarantine may also accelerate the spread of the virus. A recent study reported that the cruise ship Diamond Princess was quarantined for over 14 days; however, the infection rate on board was about four times the rate in Wuhan[18]. Prior studies reported that, without proper preparation and protection, hotels may have hastened the spread of viruses such as SARS in 2003 and H1N1 swine flu in 2009[19–21]. It is worth mentioning that we were not aware of any infection caused by hotel quarantine. Many medical observers were quarantined in a hotel in Shantou and all costs were borne by the government. Compared with home and hospital, hotel quarantine seems to solve many problems; e.g., contact with others, the limited number hospital rooms, etc. Staying in a hotel—a person a room—is much safer than home. However, hotel must be strictly sanitized and equipped with sufficient medical staff to provide a viable quarantine option for future pandemics.

There is no doubt that mandatory public health measures are essential to combat infectious diseases, especially for new emerging infectious diseases where no vaccine or cure exists[22]. A high compliance rate plays a critical role in a successful quarantine[22]; however, some individuals are reluctant to comply with a quarantine, perhaps owing to uncertainty, scarce information, economic pressure, and a widespread perception of loss of control[23]. One study suggested that income support for individuals in quarantine is essential, and avoiding this issue would hinder emergency responses[22]. Mass media campaigns are strongly needed and should be specifically tailored for different audiences. Transparency, honesty, and effective health-related communications may improve quarantine compliance[15]. Stakeholder should consider assessing residents' understanding of the virus and effectively educate them to ensure correct understanding[24].

The findings showed that little attention was paid to mental health during the pandemic in China. Several participants noted that appropriate counseling should be provided, especially for people who are experiencing long-term isolation. Research has demonstrated that a longer duration of quarantine is associated with an increased prevalence of post-traumatic stress disorder (PTSD)[25]. Though the current physicians stated they did not need psychiatric help, a prior study reported that medical workers that worked during infectious disease outbreaks had a high risk for PTSD[26]. Other research supported our results—when psychological counseling is lacking, communication with family/friends by phone, watching TV, or surfing the Internet may ease stress during a quarantine[23]. Post-quarantine, those who were isolated often display psychological distress or PTSD symptoms[27–29]. Therefore, they should be provided with the necessary psychiatric services.

## Limitations

This study had several limitations. First, participants were from a designated hospital for COVID-19 treatment, which limits the generalizability of the findings to other areas; although, we recruited

participants with different professions. Second, our inability to conduct all interviews face-to-face limited our ability to detect non-verbal language.

## Conclusions

This study documented participants' perceptions and experiences of key public health measures. Although a city-wide lockdown was effective, it should not be implemented lightly. Implementing hotel quarantines also proved effective. To increase quarantine compliance, the government and media should take steps to resolve people's concerns.

## Abbreviations

COVID-19

2019 coronavirus disease.

SARS-CoV

Severe acute respiratory syndromes coronavirus.

MERS-CoV

Middle East respiratory syndrome coronavirus.

PTSD

Post-traumatic stress disorder.

## Declarations

**Ethics approval and consent to participate:** The study has approved by the Human Research Ethics Committee Faculty Research in the First Affiliated Hospital of Shantou University Medical College. Written informed consent was obtained from individual or guardian participants.

**Consent for publication:** Not applicable.

**Availability of data and materials:** All these data and materials have not been reported in any other study.

**Competing interests:** The authors declare that they have no competing interests in this research.

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**Authors' contributions:** XD was involved in the study conception, design, and data collection. XD and SC conducted data analysis and interpretation, and writing of the manuscript. YZ and SZ participated in data interpretation, and helped to draft the manuscript. XC supervised the study implementation and identified the key themes, and critically revised the manuscript. All of authors have read and approved the manuscript

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