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The association of being in quarantine and related COVID-19 recommended and non-recommended behaviors with psychological distress in Chinese population

Introduction

Novel coronavirus SARS-CoV-2, the virus causing COVID-19, emerged in Wuhan China but rapidly spread to other regions in China. This led to the quarantine of Wuhan city, and the recommendation of a number of precautious behaviors by both the World Health organisation (WHO) and the Chinese centre for Disease control (CDC). Mortality salience increases distress (Greenberg et al., 1986), and previous studies reported increased psychological distress during the previous SARS-CoV coronavirus (Lee et al., 2007; Hawryluck et al., 2004). Anxiety can motivate people to adopt preventive measures during a pandemic (Leung et al., 2005). Drawing on health belief models (Weinstein and Nicolich, 1993), research conducted during H1N1 ('swine flu') and SARS-CoV positively associated distress with internationally recommended health behaviours (Leung et al., 2005). However, anxiety may also encourage non-recommended, avoidant behaviours (Rubin et al., 2009). To date no empirical study to date has examined associations between psychological distress, quarantine and the use of recommend and non-recommended behaviors. Understanding this may be crucial for comprehending the psychological drivers of important behaviors at a time of national crisis, as well as the avoidance of behaviors with negligible or negative impact on health outcomes.

Methods

We used an internet panel in China to recruit a national sample (n = 1134) between 4 and 10 March 2020 using a random and stratified sampling with oversampling of Hubei region and the city of Wuhan. We employed a survey company specializing in East Asia (Asia Opinions), which uses a panel of participants across East Asia, including China. Participants are sent invitations to participate in the study and given small incentives for participation. The mean age of these participants was 31.01 years (SD = 6.81, range = 18–59), 53.5% were female (n = 607), 7.6% (n = 86) of the participants were living in Hubei region excluding Wuhan, 128 (11.3%) were living in the city of Wuhan and 920 (81.1%) were living in the rest of China.

Each participant signed an electronic informed consent form. The response rate for the survey was 42.7%.

Being in quarantine was measured by the question: "Are you currently in quarantine because of the Coronavirus?". For our study we took recommended behaviours to include those showing appropriate actions to mitigate infection risk, as suggested by international health bodies. These included three items selected from WHO guidelines (Coronavirus disease (COVID-19) advice for the public 2020). "1. I am making sure that I ventilate the house regularly to help contain the risk of the virus". "2. When I get a chance to go out, I keep a distance of at least a meter from others when I go outside". "3. I try to avoid people who show cold or flu-like symptoms".

Non-recommended behaviors were health behaviours that provide little protection against infection, or economic action that contradict national guidelines for returning to normal activities once the pandemic risk is reduced. We measured non-recommended health behaviours using two items from the WHO MythBusters list (Coronavirus disease (COVID-19) advice for the public – MythBusters 2020). 1. I am taking some vitamins to help protect me safe from covid-19. "2. I have taken traditional medicines to keep me safe from covid-19". Non-recommended economic behavior was measured by the item: "3. When my work reopens, I will take a few extra days off just to be on the safe side.

Translations of all items in the questionnaire were validated using a bilingual group of translators.

Psychological distress was measured by Kessler's K6 (Chinese version, Appendix A) (Kessler et al., 2003). Scores ranged from 0 to 24, with 13 or higher indicating elevated psychological distress. Cronbach α was satisfactory (0.90). The K6 Chinese version was culturally adapted and validated as reported elsewhere (Kessler et al., 2010).

Data was analyzed using a multivariate logistic regression (Meurer and Tolles, 2017) to measure the association between elevated psychological distress (K6 ≥ 13) as the outcome measure with the following variables entering the equation: 1. Demographics (age, sex, region). 2. Currently being in quarantine. 3. Recommended behaviors. 4. Non-recommended behaviors. For each variable we calculated odds ratio (OR) and 95% C.I. using SPSS version 25 (IBM).

Results

Risk of severe mental illness was evident in 19.1% of the sample (n = 217). Elevated psychological distress was found among those who live in Hubei region excluding Wuhan (OR = 2.50 (95% CI: 1.44–4.32); p = <0.001), those living in Wuhan excluding Hubei region (OR = 3.56 (95% CI: 2.25–5.61); p = .001), respondents currently in quarantine (OR = 1.83 (95% CI: 1.17–2.84); p = .008), those practicing non-recommended behaviors such as taking vitamins as protection against COVID-19 (OR = 2.01 (95% CI: 1.42–3.11); p = .001) and participants planning to return to work a few days after it officially opens (OR = 2.21 (95% CI: 1.46–3.35); p = <0.001). Practicing recommended behaviors were associated with lower psychological distress: (Regularly ventilating the house in order to contain the risk of COVID-19 (OR = 0.38 (95% CI: 0.20–0.72); p = .003), Keeping distance of at least one meter when going out (OR = 0.46 (95% CI:

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Table 1
Participant Characteristics, COVID-19 Related Aspects and Behaviors as Associated with Elevated Psychological Distress.

	China (n = 1134)				
Demographics	Mean	SD	N	%	OR (95% CI)
Age, Years	30.99	6.82			1.00 (0.97–1.02)
Sex, Female			607	53.5	1.16 (0.82–1.64)
Rest of China			920	81.1	
Hubei Region (excluding Wuhan) vs. Rest of China			86	7.6	2.50 (1.44–4.32)***
Wuhan vs. Rest of China			128	11.3	3.56 (2.25–5.61)***
Isolation					
In quarantine			142	12.5	1.83 (1.17–2.84)**
Recommended Behaviors based on WHO recommendations					
Ventilate the house regularly, Yes			1059	93.4	0.38 (0.20–0.72)**
Keeping social distance, Yes			1065	93.9	0.46 (0.23–0.93)*
Avoiding people who show cold or flu-like symptoms, Yes			1062	93.7	0.14 (0.07–0.28)***
Non-recommend behaviors					
Taking some vitamins to help protect me from COVID-19, Yes			400	35.3	2.01 (1.42–3.11)***
Taking traditional medicines to keep me safe from COVID-19, Yes			318	28.0	1.37 (0.92–2.04)
non-recommended economic behavior					
When my work reopens, taking a few extra days off just to be on the safe side, Yes			726	64.0	2.21 (1.46–3.35)***

* $p \leq 05$.
** $p \leq 01$.
*** $p \leq 001$.

0.23–0.93); $p = .03$) and avoiding avoid people who show cold or flu-like symptoms (OR = 0.14 (95% CI: 0.07–0.28); $p = <0.001$)). See Table 1 for more information.

Discussion

Psychological distress was highest amongst those at the original epicenter of the outbreak (Hubei region, Wuhan city), as well as those in quarantine. Respondents in quarantine were faced with a range of challenges, both physical (e.g. financial loss) and psychological (stigma, absence of psychological support services) (Brooks et al., 2020; Wang et al., 2020). Over 90% of the participants reported adhering to the WHO guidelines regarding recommended behaviors. Lower psychological distress was evident amongst those following these guidelines, suggesting that effective preventive action, coupled with high levels of trust in the information received (Wang et al., 2020) may play an important role in distress reduction. While this may suggest potential social desirability bias (Krumpal, 2013), high levels of recommended behavioural compliance were also reported in other Chinese work during this pandemic (Wang et al., 2020), as well as previous pandemic outbreaks in China (Goodwin and Sun, 2013). Consistent with earlier work on H1N1 (Rubin et al., 2009), higher distress was also associated with non-recommended behaviors (taking vitamins, reluctance to return to work), While adhered to by a lower percentage of respondents (from 28%−64%), such behavior may result from a belief in misleading 'scientific' information, often presented online (the primary route of information about the pandemic in China) (Wang et al., 2020). Social media use has been associated with mental health risk during COVID-19 (Holmes et al., 2020). The use of traditional medicine was also consistent with a Chinese culture of traditional medicine, also evident during H1N1 and often favored when there is no clear treatment for an emerging risk.

We recognize several limitations. Our study was cross-sectional and responses were self-reported. As is common with research on-line (Wang et al., 2020) our sample was predominately a young one. While we recognize that many respondents may have had personal experiences of epidemic threat during the H7N9 avian influenza outbreak (Goodwin and Sun, 2013) we had no information on past medical or psychological conditions nor we did have information regarding number of days in quarantine, type of information received about the effectiveness of preventive measures, the level of awareness, or health literacy at the individual or community level. We did not include other significant predictors of risk perception significant during H1N1 (e.g. personal values) (Goodwin et al., 2011), or other proximal factors significant in a variety of health belief models (e.g. attitude towards the behavior, perceived behavioural control and social pressure to perform from others (Armitage and Conner, 2000). Broader cultural influences on community health responsibilities and the minimization of risk may also be particularly important in a collective society such as China (Hofstede, 2001). Finally, we did not consider additional psychological consequences of anxiety such as the stereotyping and prejudice reported during SARS (Washer, 2004).

However, this to our knowledge is the first study to empirically examine the association between psychological distress, quarantine and recommend and non-recommended behavior during COVID-19. Findings suggest that authorities should address the mental toll of quarantine over time, and reduce anxiety in order to limit unnecessary or costly actions.

Declaration of Competing Interest

None.

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All the authors have contributed to the paper in terms of conceptualization, data collection, analyses of the paper, writing, and important intellectual contribution.

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Appendix

Appendix A

Kessler's K6 (English version).

Please circle the number that best describes how often you had this feeling during the last month? During the past 30 days, about how often did you feel...	None of the Time	A little of the Time	Some of the Time	Most of the Time	All of the Time
1. Nervous	1	2	3	4	5
2. Hopeless	1	2	3	4	5
3. Restless or fidgety	1	2	3	4	5
4. So depressed that nothing could cheer you up	1	2	3	4	5
5. That everything was an effort	1	2	3	4	5
6. Worthless	1	2	3	4	5

Reference for Kessler's K6 (Kessler et al., 2003).

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jad.2020.06.026.

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