

Psychological and behavioural responses to COVID-19: a China–Britain comparison

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ABSTRACT

Introduction Despite the burgeoning literature on COVID-19, there has been little cross-national work on the correlates of mental health or its association with pandemic behaviours. We considered psychological distress, quarantine status, social distancing and self-medication in China and the UK.

Methods We conducted online surveys in China (N=1135) and the UK (N=1293), beginning in March 2020. Participants indicated demographics, whether they were in quarantine, relationship status, social distancing, use of vitamins/traditional medicines and completed the K6 scale of psychological distress.

Results 19.1% of the respondents in China were at risk of severe mental illness (SMI: 95% CI 16.9% to 21.6%) and 16.6% (95% CI 14.6% to 18.8%) in the UK. Risk of SMI was among those in quarantine (OR 11.18 (95% CI 4.08 to 30.62); $p=0.001$) and in younger respondents (OR 2.61 (95% CI 1.01 to 6.79); $p=0.048$) although the latter effect was significant only in the UK. Risk of SMI was positively associated with self-medication ($\beta=0.17$, $p=0.001$) and negatively with social distancing in China (country \times SMI $\beta=0.51$, $p=0.001$), with further interactions for age and sex (social distancing), age, marital status and quarantine (self-medication).

Discussion Across the countries, quarantine was associated with poorer mental health, while greater psychological distress was associated with greater self-medication rate. Future work should explore further cross-national variations in psychological health and behaviours during pandemics.

Faced with pandemic threat, different countries have varied substantially in their reactions. These responses will be informed by a wide range of environmental and political influences, which impact on the speed, scale and efficacy of lockdowns.⁵ We compare China and the UK, two countries that varied in terms of exposure to COVID-19 in the life-cycle of the pandemic, number of cases and mortality rate, and the timing and stringency of their lockdowns and associated public responses⁵ (see online supplemental figure 1 for details). Less clear is the impact of these different policies on distress and pandemic behaviour. In China, almost 35% of the respondents reported psychological distress,⁶ with this distress greater in women and younger respondents. In the UK, national surveys suggest increased anxiety and stress as a result of COVID-19,¹ with greater anxiety among women and the young.⁷ While both countries recommended social distancing to tackle the pandemic, particularly from those who are symptomatic, the use of traditional medicines to reduce infection risk is more established in China.⁸ In this paper, we report data collected approximately 2 months after the first SARS-CoV-2 case in each nation. We do this to examine¹ the associations between demographics and risk of severe mental illness (SMI) in each country and² associations between risk of SMI, social distancing and self-medication (via vitamins and traditional medicines) in each nation.

METHOD

Following ethical approval by the funding university, two online surveys collected data from March 4, 2020 (China, N=1135) to March 31, 2020 (UK, N=1293). In both countries, the same survey company (AsiaOpinions) accessed a series of internet panels in each country, following guidelines established by the International Chamber of Commerce International Code on Market and Survey Research (ICC/ESOMAR). Online consent was obtained for all participants. All procedures complied with the Declaration of Helsinki 1975/2008.

A self-report questionnaire asked respondents to report sex, age, relationship status and whether they were currently in quarantine (*yes/no*). Table 1 reports respondent details by country. Risk of SMI was measured using the six-item K6 scale,⁹ with items scored as 0–4 (range 0–24, cut-off ≥ 13). Social distancing was assessed by *avoiding others showing cold or influenza-like symptoms, maintaining at least a metre's distance from others* and self-medication by *I am taking some vitamins to help protect me* and *I have taken traditional medicines*

As COVID-19 spreads worldwide, increasing attention has been paid to the need for international comparisons to inform the global response.¹ However, there have been few comparisons across countries using analogous measures. This has important implications. First, predictors of the mental health toll of the virus are not readily comparable. Psychological support may need to be provided to different population segments in different societies. During the outbreak of SARS, quarantine was associated with increased psychological distress,² but this has not been assessed cross-nationally. Second, previous work on pandemics suggests an association with anxiety and adherence to recommended social distancing,³ as well as other more contested behaviours, such as the use of vitamins and traditional medicines.⁴ However, a lack of cross-national comparisons means that associations between mental health and these behaviours cannot easily be gauged at the international level.



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Table 1 Participant characteristics by country

Country	China (N=1135)				UK (N=1293)			
	Mean	SD	N	%	Mean	SD	N	%
Demographics								
Age, years	30.99	6.82			51.51	14.75		
Sex, female			607	53.5			689	53.3
In relationship			893	78.7			892	69.0
Isolation								
In quarantine vs not in quarantine			142	12.5			389	30.1
Behaviours								
Social distancing								
Avoiding others showing cold or influenza-like symptoms			1063	93.7			1299	95.1
When I get a chance to get out I maintain at least a metre's distance from others			1066	93.9			1245	96.3
Medication								
Taking vitamins to protect me			400	35.2			421	32.6
Taken traditional medicines to keep me safe			318	28.0			164	12.7
Risk of SMI								
K6≥13			217	19.1			215	16.6

SMI, severe mental illness.

to keep me safe from COVID-19) (all yes/no). This created two indices: social distancing (scored 0–2) and self-medication (0–2). Inter-item correlations for the indices were satisfactory for each country (social distancing $r(1293)=0.50$ (UK), $r(1135)=0.48$ (China); self-medication $r(1135)=0.48$ (China), $r(1293)=0.44$ (UK); all $p=0.001$).

RESULTS

In China, 217 of 1135 respondents (19.1%) were at risk of SMI (95% CI 16.9% to 21.6%), and in the UK, 215 of 1293 participants were at risk of SMI (16.6% (95% CI 14.6% to 18.8%)). Because of increased mortality risk from SARS-CoV-2 after the age of 40, respondents were grouped into below 40 or aged 40+. To assess predictors of SMI, we conducted logistic regression models—examining main effects and interaction effects procedurally—on the probability of SMI. We examined main effects by entering, in a nested design, first, (1) sex, (2) age group, (3) quarantine status, (4) country, (5) relationship status and then (step 2) interaction effects by adding product terms, (6) age×country, (7) quarantine×country, (8) sex×country, (9) relationship×country and (10) quarantine×relationship. Results (table 2) showed significant interactions between agegroup and country and between quarantine and country, with the effect of quarantine stronger in China (in China: 42.3% in quarantine at risk of SMI vs 15.8% who were not (OR 5.98 (95% CI 1.77 to 20.24), $p=0.004$; in the UK: 25.4% vs 12.8%, OR 4.01 (95% CI 1.59 to 10.06), $p=0.003$). The simple age effect was significant only in the UK (OR 0.51 (95% CI 0.37 to 0.71), $p=0.001$); for China, OR 1.16 (95% CI 0.74 to 1.81), $p=0.53$.

We then ran nested ordinal regressions on social distancing and self-medication, respectively, first entering risk of SMI, country, age, sex, relationship status, quarantine status and then the same

Table 2 Multiple regressions on risk of SMI

	β	Exp (β)	P value	95% CI lower	95% CI higher
Step 1					
Sex	−0.35	0.72	0.320	0.36	1.40
Age group (young)	0.96	2.61	0.048	1.01	6.79
Relationship (single)	−0.73	0.48	0.094	0.21	1.31
In quarantine (yes)	2.41	11.18	0.000	4.08	30.62
Country (China)	−0.08	0.92	0.897	0.27	3.15
Step 2					
Country×sex	0.36	1.44	0.101	0.93	2.22
Country×age group	−0.81	0.44	0.004	0.25	0.77
Country×quarantine	−0.54	0.49	0.033	0.36	0.96
Country×relationship	0.49	1.63	0.066	0.97	2.73
Quarantine×relationship	−0.44	0.64	0.117	0.37	1.12

SMI, severe mental illness.
 $p<0.05$ indicated in bold.

interaction terms as for SMI (above). Those at less risk of SMI, older respondents and women were most likely to report social distancing, with an interaction between risk of SMI×country (Chinese respondents at risk of SMI social distanced less than those not at risk (mean 1.63 vs 1.94) but there was no significant effect in the UK (both Ms 1.91)). There were also interactions for social distancing for age×country, sex×country and marital status×country, with social distancing highest among British respondents who were older, female and in an intimate relationship (online supplemental table 1). Those at risk of SMI in both countries were more likely to report self-medication. Self-medication was higher overall among Chinese respondents, younger respondents, those who were single and those in quarantine. There were further interaction effects for age×country, quarantine×country and sex×country, with older Chinese, Chinese in quarantine and men in China most likely to self-medicate (online supplemental table 2).

DISCUSSION

SARS-CoV-2 presents a truly global health threat. We compared two different countries, China and the UK, chosen because of different caseloads and mortality rates and their public health responses to this threat. Those living under quarantine reported greater stress, with this effect stronger in China. Younger respondents also reported a greater mental health burden, with this association more pronounced in the UK. Risk of SMI predicted the use of self-medication in both countries, with older Chinese, Chinese in quarantine and men in China most likely to self-medicate. Risk of SMI was associated with lesser willingness to social distance in China and was greatest among British respondents who were older, female and in an intimate relationship.

Our findings suggest that, as elsewhere, quarantine is likely to be an important contributor to psychological distress. Mental health professionals need to be wary of this potential burden on health services.¹ The greater impact of quarantine in China may reflect the strict measures adopted in Hubei province (the area from which we recruited most of our quarantined participants) compared to the UK. There was also an associated potential for negative social labelling associated with living in an area of high infection, also observed in Hong Kong during SARS pandemic.¹⁰ A greater anxiety among younger respondents may be attributed to the greater use of online information among younger populations, with a consequent impact on (dis)trust.¹¹ The higher levels

of distress among young people in the UK in particular may result from a lack of clarity in governmental messaging during this crisis,⁵ which encouraged a greater adherence to online conspiracy beliefs.¹² In contrast, social media is more regulated in China,¹³ which potentially limited the negative health impact of such accounts.

Our pancultural findings show a pancultural association between high levels of distress and willingness to self-medicate. While traditional medicine is well established in China, its role in the treatment of COVID-19 has been debated,¹⁴ with some arguing that its use may delay diagnosis and even lead to deleterious side effects.^{15 16} Practitioners in both countries need to work with broader healthcare systems to be clear about the usage of this medication during COVID-19. Messages that draw on a collective purpose and a sense of obligation to others may be particularly effective in the Asian context,¹⁷ while particular care must be taken in the UK to combat conspiracy theories that threaten effective health behaviour.¹² In doing so, it is important, too, to recognise intersectional variations: for example, while younger people were more likely to self-medicate overall, it was those aged over 40 years in China who were the most likely to perform this behaviour.

We recognise a number of limitations. Data were self-reported, and we tested only a limited number of pandemic behaviours. Although we used the same survey company for each study, both used a convenience sample and accessed different internet panels in each country, potentially limiting the range of potential respondents. Mental health is not stable across the life course,⁶ but the restricted age range of our Chinese sample, which was younger and less varied than our UK cohort, limited our ability to explore associations between age and mental health. Social distancing was adapted by the overwhelming majority of our respondents (more than 90%), limiting the variability in our predictors. We did not have data on income, education or occupation, despite disparities between such group in pandemic risk.¹⁸ We did not explore further predictors of distress or behaviour such as trust in government or other cultural or structural factors (eg, mask-wearing norms, access to education, housing types and availability). Finally, we used a measure of psychological distress (K6), which is relatively new and was not therefore widely employed during previous pandemics. This made it difficult to directly compare levels of psychological distress across analogous threats.

Data following SARS suggest a probable decline in the mental health burden of this novel coronavirus over time.¹⁹ Much however might depend on the future shape of the pandemic. As workers are encouraged to return to their workplace, those unable to maintain social distance at work may experience greater distress. Future research should further explore cross-cultural similarities and differences, comparing societies at similar time points in a pandemic to best gauge likely responses and motivate effective behavioural intervention.

What is already known on this subject

- Previous research on the mental health consequences of COVID-19 has rarely contrasted countries at different stages of the pandemic, or whose governments have made very different responses to the threat. These factors are likely to have implications for mental health as well as the performance of both widely recommended and more contested pandemic behaviours.

What this study adds

- We find a relatively high risk of severe mental illness (SMI) in both China and the UK (among 19.9% and 16.6% of respondents, respectively) with risk of SMI greatest among those in quarantine and in young British respondents. This suggests the importance of both national and intracountry variations in the mental toll due to COVID-19. Risk of mental illness was positively associated with self-medication in both countries and with reluctance to socially distance in China, indicating important associations between mental health and pandemic behaviours. Researchers and public health practitioners need to be aware of the potential implications of governmental policies during a pandemic and the associations between mental health and important pandemic behaviours.

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REFERENCES

- Holmes EA, O'Connor RCO, Perry VH, *et al.* Multidisciplinary research priorities for the COVID-19 pandemic. *Lancet*.
- Hawryluck L, Gold WL, Robinson S, *et al.* SARS control and psychological effects of quarantine, Toronto, Canada. *Emerg Infect Dis* 2004;10:1206–12.
- Rubin GJ, Amlôt R, Page L, *et al.* Public perceptions, anxiety, and behaviour change in relation to the swine flu outbreak: cross sectional telephone survey. *BMJ* 2009;339: b2651.
- Goodwin R, Sun S. Early responses to H7N9 in southern Mainland China. *BMC Infect Dis* 2014;14:8.
- Scally G, Jacobson B, Abbasi K. The UK's public health response to COVID-19. Too little, too late, too flawed. *BMJ* 2020;369:m1932.
- Qiu J, Shen B, Zhao M, *et al.* A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. *Gen Psychiatry* 2020;33:e100213.
- Ipsos MORI. COVID-19 and mental wellbeing. Available <https://www.ipsos.com/ipsos-mori/en-uk/COVID-19-and-mental-wellbeing> (accessed 7 Apr 2020)

- 8 Aw JYH, Yiengprugsawan VS, Gong CH. Utilization of traditional Chinese medicine practitioners in later life in Mainland China. *Geriatrics* 2019;4:49.
- 9 Kessler RC, Barker PR, Colpe LJ, *et al.* Screening for serious mental illness in the general population. *Archiv Gen Psychiatry* 2003;60:184–9.
- 10 Lee S, Chan LY, Chau AM, *et al.* The experience of SARS-related stigma at Amoy Gardens. *Soc Sci Med* 2005;61:2038–46.
- 11 Garfin D, Silver R, Holman A. The novel coronavirus (COVID-2019) outbreak: amplification of public health consequences by media exposure. *Health Psychol* 2020;39:355–7.
- 12 Allington D, Duffy B, Wessely S, *et al.* Health-protective behaviour, social media usage and conspiracy belief during the COVID-19 public health emergency. *Psychol Med* 2020;1–7.
- 13 Fu K-W, Zhu Y. Did the world overlook the media's early warning of COVID-19? *J Risk Res* 2020;1–5.
- 14 Cyranoski D. China is promoting coronavirus treatments based on unproven traditional medicines. *Nature* 2020;
- 15 Yang Y. Use of herbal drugs to treat COVID-19 should be with caution. *Lancet* 2020;395:1689–90.
- 16 Gray PE, Belessis Y. The use of traditional chinese medicines to treat SARS-CoV-2 may cause more harm than good. *Pharmacol Res* 2020;156:104776.
- 17 Van Bavel JJ, Baicker K, Boggio PS, *et al.* Using social and behavioural science to support COVID-19 pandemic response. *Nat Hum Behav* 2020;4:460–71.
- 18 ONS. Office for National Statistics, UK. Which occupations have the highest potential exposure to the coronavirus (COVID-19)? 11 May 2020. Available <https://www.ons.gov.uk/employment/and/labour/market/people/in/work/employment/and/employee/types/articles/which/occupation/shave/the/highest/potential/exposure/to/the/coronavirus/COVID-19/2020-05-11> (accessed 22 Jun 2020)
- 19 Leung GM, Ho LM, Chan SK, *et al.* Longitudinal assessment of community psychobehavioral responses during and after the 2003 outbreak of severe acute respiratory syndrome in Hong Kong. *Clin Infect Dis* 2005;40:1713–20.