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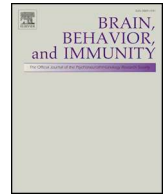
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Contents lists available at ScienceDirect

Brain, Behavior, and Immunity

journal homepage: www.elsevier.com/locate/ybrbi

Illness perception, mood state and disease-related knowledge level of COVID-19 family clusters, Hunan, China



ARTICLE INFO

Keywords:

COVID-19
Family cluster
Perception
Psychology

Dear editor,

The coronavirus disease 2019 (COVID-19) pandemic is inevitably affecting all aspects of our society, including physical and mental health. The latest papers have thoroughly revealed the psychological impact of COVID-19 on the general public (Wang et al., 2020) and medical workers (Kang et al., 2020). Among those discoveries, we have noticed a frequently mentioned issue adding to peoples' concern/distress—worry about family members who have been infected. Family cluster infection is one of the features of COVID-19, with clusters of cases sharing in time and location by common exposures within a family. According to a survey, 50% of patients reported that they have relatives who are infected (Zhang et al., 2020), which places pressure on the social relationships of patients and their families. However, it is unknown how these pressures might impact patient psychological health.

Hence, we have carried out a cross-sectional survey study on patients with COVID-19. From February 15 to February 25, 2020, 118 patients diagnosed with COVID-19 in the designated hospital in Hunan province were recruited and completed a survey. Basic information including sex, age, etc., was collected. A COVID-19-related knowledge quiz, with 25 multiple choice questions and a highest possible score of 100 was designed by our team and filled out by the patients, the aim was to evaluate each individual's subjective factors about home isolation, personal protection, daily cleaning, and sanitation. Illness perception and mood state were evaluated by The Revised Illness Perception Questionnaire (IPQ-R) and the Profile of Mood State (POMS) questionnaire, respectively, both of which have been found to have good reliability and validity in Chinese (Wu et al., 2018; Lyu et al., 2019).

Collectively, among the 118 patients, the interval time between taking the questionnaire survey and the COVID-19 diagnosis varied from 0 to 35 days, with a mean of 15 days; the median age was 41 years; 48% of the participants were women; and 96% of the cases were not-severe or critical. In addition, 60 of the participants (51%) reported that they have infected family members. There were no statistically significant differences among educational background, marriage status, household monthly income, clinical classification of COVID-19, employment, place of residence, or comorbidity between

patients with family clusters and other cases ($P > 0.05$). There were 6 patients who reported 'unable to self-care', and all of them reported a family members' infection ($P = 0.01$). The results of the IPQ-R showed that, compared with the cases without family infection, the patients with family clusters considered the consequences of the disease to be more severe ($P = 0.016$), tended to lack confidence in treatment ($P = 0.020$), and expressed less comprehension of the disease ($P = 0.040$). The POMS showed no significant differences in the tension, depression, anger, fatigue, vigor, confusion, or esteem between the two groups ($P > 0.05$) (Table 1). Moreover, the patients involved in family clusters had a significantly lower COVID-19-related knowledge quiz score in a subgroup analysis of patients who had just had their diagnosis confirmed in the last 10 days ($P = 0.044$), with a score of 76.7 ± 15.2 (mean \pm SD) in the family clusters ($n = 22$) versus 85.2 ± 6.5 in the rest ($n = 17$). Two questions had a significantly lower rate of correct answers in the family clusters group, which focused on virus decontamination ($P = 0.039$) and the criteria for ending a self-quarantine of COVID-19 confirmed cases ($P = 0.048$).

To our knowledge, our study is the first to reveal that COVID-19 family cluster patients have more negative illness perceptions, and illness perception may have a significant adverse impact on psychological distress and quality of life (Vegni et al., 2019). In a 1-year follow-up study of SARS survivors, 33% of patients reported a significant decrement in mental health, and meanwhile, their family caregivers experienced considerable emotional distress (Tansey et al., 2007).

Our study has raised several important points. First, with COVID-19, the occurrence of familial clusters of infection (including of the caregivers themselves) leads to less support from relatives, and as a cluster, they may face more pressure from communities, consistent with the severe consequences domain of the IPQ-R.

Second, lack of comprehension of the disease may be related to the occurrence of family cluster cases among people with less COVID-19 knowledge. Therefore, the government and public health authorities should spare no efforts in popularizing preventative knowledge such as how to decontaminate surfaces and clothing of the virus, and the criteria for finishing a self-quarantine for confirmed/suspected cases, especially during "shelter at home" periods.

Third, the lack of confidence in the treatment of IPQ-R suggests that better science education and psychological interventions for patients in

<https://doi.org/10.1016/j.bbi.2020.05.045>

Received 12 May 2020; Accepted 12 May 2020

Available online 18 May 2020

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Table 1

Comparison of illness perception and mood state between family clusters and other cases with COVID-19.

Measure	All cases (n = 118)	Family clusters (n = 60)	Other cases (n = 58)	t	P Value
<i>IPQ-R</i>					
Time line	12.06 ± 3.90	12.60 ± 3.65	11.50 ± 4.09	-1.542	0.126
Cyclical symptoms	10.00 ± 2.92	10.28 ± 3.06	9.72 ± 2.75	-1.042	0.300
Consequences	14.56 ± 4.04	15.43 ± 3.92	13.65 ± 3.99	-2.442	0.016
Personal control	21.42 ± 3.44	20.88 ± 2.80	21.96 ± 3.95	1.712	0.090
Treatment control	19.17 ± 2.56	18.63 ± 2.21	19.72 ± 2.78	2.359	0.020
Coherence	16.93 ± 3.86	16.22 ± 3.99	16.22 ± 3.60	2.079	0.040
Emotional representations	16.60 ± 4.47	17.16 ± 4.02	16.00 ± 4.86	-1.424	0.157
<i>POMS</i>					
Tension	5.78 ± 4.62	5.76 ± 4.38	5.81 ± 4.89	0.051	0.959
Anger	4.58 ± 5.20	5.13 ± 5.53	4.01 ± 4.81	-1.167	0.246
Fatigue	3.45 ± 3.43	3.91 ± 3.71	2.96 ± 3.06	-1.514	0.133
Depression	4.31 ± 4.28	4.61 ± 4.52	4.00 ± 4.02	-0.781	0.436
Vigor	10.26 ± 5.22	10.18 ± 5.38	10.34 ± 5.09	0.167	0.867
Confusion	3.95 ± 3.22	4.12 ± 3.16	3.78 ± 3.31	-0.572	0.568
Esteem	7.26 ± 3.62	7.20 ± 3.65	7.32 ± 3.62	0.190	0.849
TMD ^a	104.56 ± 22.93	106.16 ± 24.10	102.90 ± 21.74	-0.773	0.441

Abbreviations: IPQ-R, Revised Illness Perception Questionnaire; POMS, Profile of mood state questionnaire; TMD, Total Mood Disturbance.

^a TMD = total negative emotion score (tension, anger, fatigue, depression, confusion) – total positive emotion score (vigor, esteem) + 100.

clusters are necessary to help them rationally recognize the disease.

In conclusion, the results of our study highlight the potential benefits of a family-centered approach to follow-up care and the importance of exploring strategies to optimize the psychological management of an epidemic illness.

Additional contribution

We would like to thank Yanhua C (The First People's Hospital of Yueyang); Jianwei Z (The Second People's Hospital of Yueyang); Tiejing Q, Huilin Z (The Second Xiangya Hospital); and Ranran M (Xiangya Nursing School of Central South University) for help in the collection of patient data.

CRediT authorship contribution statement

Haiyang Liu: Conceptualization, Data curation, Formal analysis, Writing - original draft. **Xuting Li:** Writing - original draft. **Qiongni Chen:** Data curation. **Yamin Li:** Resources. **Chaoying Xie:** Resources. **Man Ye:** Data curation, Formal analysis, Writing - review & editing. **Jin Huang:** Formal analysis, Resources, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgment

This work was supported by grants from the Special Funds of Hunan Innovative Province Construction, China (grant number: 2020SK3003).

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