Eight Months Into The COVID-19 Outbreak, Whether This Pandemic Still Psychologically Affected Convalescent Psychiatric Patients: A Cross-Sectional Study.

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Abstract

Background

This study aimed to find out eight months into the COVID-19 outbreak, how much psychological effect was experienced by convalescent psychiatric patients, and identify the potential risk and protective factors related to their psychological response.

Methods

Data from 136 convalescent psychiatric patients were collected. We used binary logistic regression analyses to identify participants’ SRQ score and the factors associated with it.

Results

There were 47 (34.5%) participants scored eight or higher. Working or marital status and annual income were significantly associated with a higher score in SRQ. Similarly, sleep duration, interpersonal relationship, exercise time, special events, and general condition were linked to SRQ grade.

Conclusions

Eight months into the COVID-19 pandemic, this widespread virus psychologically impacted convalescent psychiatric patients. This result was related to less annual income, which stressed the necessity to provide closer follow-up and financial support in this crisis’s late stage.

Background

Coronavirus Disease 2019 (COVID-19) first emerged in Wuhan, China, in December 2019. Since then, this virus, which caused acute infectious pneumonia, has spread rapidly and widely. Considering its severity, China government implemented a national lockdown to prevent the virus from spreading. Although several unprecedented measures were adopted, the number of confirmed cases had surged up to 24,324 people across thirty-one provinces in Mainland China until 4 February. The World Health Organization (WHO) declared it a health emergency of international concern and further, a pandemic finally on 11 March 2020. To date, COVID-19 has claimed 1,048,781 lives globally.

Previous studies illustrated that epidemic outbreaks increased adverse emotion response among the general public. The well-established medical, social, and economic factors could lead to fear or anxiety. During the COVID-19 pandemic, earlier literature suggested over 50% of the general population reported emotional distress in China, and several vulnerable groups showed higher rates of negative psychosocial effects. For example, the homeless who led an extremely stressful life and had difficulty getting hand sanitizers, and patients with pre-existing medical, psychiatric or substance use problems. Consequently, the national commission formulated a few emergency guidelines for those who were more liable to be affected. Dozens of research focus on the sub-groups with additional vulnerabilities to potential physical and psychological influence caused by the COVID-19 pandemic. One of the sub-groups that faced enormous challenges was patients with mental disorders.
reported that COVID-19 infected 50 patients and 30 medical staff at Wuhan Mental Health Centre. Most hospitals stopped regular family visit to protect patients who stayed in closed psychiatric wards from being contaminated. One research revealed that severe mental disorder patients gave a higher anxiety response than patients with other mental disorder and healthy controls. For patients who are in the recovery phase, their treatment continuity is under threat. Although quarantine and lockdown restrictions are crucial to containing the virus, these measures disrupted their communication with loved ones and restricted public mental health service access. According to a report, isolation from the family and the loneliness increased disease recurrence and mental health status deterioration. We reasonably assume that convalescent psychiatric patients encounter no fewer obstacles than their counterpart in hospitals. This ongoing public health crisis reduced outpatient visits and hindered patients from obtaining timely medication. The previous study conducted by Gao et al. found that 70% of outpatients with emotional disorders had to postpone their mental health treatment, and had more negative expectations towards COVID-19. However, there remains few research on investigating the influence of COVID-19 pandemic on psychiatric patients in stable condition; and the published surveys were about the psychological impacts in the early stage of the outbreak. As this pandemic in China is now under control, the whole workforce and outpatient service are getting back to normal. Additional research is needed to improve understanding of the after psychological effects of infectious disease outbreaks.

Thus, this study has two aims. Firstly, we want to find out that eight months into the COVID-19 outbreak, whether there is still a psychological effect of this pandemic on our convalescent psychiatric patients. The second aim is to identify the risk factors related to their psychological response.

**Method**

To investigate the psychological effects of the post-pandemic, we utilized a cross-sectional method. We sent an online questionnaire via social media (Wechat) to psychiatric patients from the data collected by Tongde Hospital of Zhejiang Province, Hangzhou, China. The psychiatric patients were recruited from 1 to 31 August 2020 and signed written informed consent. The authors state that all procedures contributing to this study comply with the relevant national and institutional committees‘ ethical standards on human experimentation. The Ethics Review Committee of Tongde Hospital of Zhejiang Province approved all procedures involving human subjects/patients.

Inclusion criteria were: (1) aged 18 years old or above; (2) had been previously diagnosed by a psychiatrist as schizophrenia, schizo-affective disorder, bipolar disorder, major depression, anxiety disorder, or obsessive-compulsive disorder according to Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition or International Classification of Diseases 10th Revision; (3) able to understand and complete the survey and accept informed consent. Exclusion criteria included: (1) aged 18 below; (2) inability to understand or complete the survey; (3) presence of any neurological, cardiovascular, respiratory, endocrine, or inflammatory diseases; (4) suspected or confirmed cases of COVID-19.

The questionnaire contained three components: (1) general demographic information; (2) questions related to COVID-19 and its impacts; (3) Self-reporting Questionnaire (SRQ).

General demographic information included participants‘ age, gender, educational level, career, financial condition, marital status, and clinical profile (previous diagnosis and medication compliance).

Questions related to COVID-19 have two parts. In part one, we asked the participants to answered six basic questions about COVID-19 itself, such as ‘this virus is airborne and droplets from cough and sneezes could transmit the virus’,
and ‘washing your hands with soap and water can kill the virus that may be on your hands’. Then ‘fully aware’ would be recorded for participants get all questions right, ‘partially aware’ for at least three correct responses, and ‘poorly aware’ for less than three. Next, participants were required to answer questions like ‘do you have enough protective equipment’. In part two, we designed several additional questions about the psychological influence of pandemic: sleep duration, interpersonal relationship, exercise time, and general state. Responses were graded from 1 (very satisfied) to 5 (not at all satisfied). Participants also needed to consider any special event, other than this pandemic, impacting them positively or negatively. Grade 1 means very positive impact, while grade 5 means very negative impact.

There were 20 questions in Self-reporting Questionnaire, intending to estimate if the participants displayed any mental distress due to the COVID-19 pandemic. The total SQR score was divided into the low-risk group (< 8) and high-risk group (≥ 8).

All the analyses were conducted using SPSS Statistics 24.0, and the level of significance was set at 5%. Descriptive statistics were used to summarize the variables, mean and standard deviation were used for continuous variables, while frequency and percentage were used for categorical variables. Inferential statistics, including independent sample t-test, and Mann-Whitney U test, was used to examine if there was any difference in the outcome variables. We adopted a binary logistic regression analysis to examine the association between the outcome variables and the demographic variables.

**Results**

1. **General demographic information of participants**

One hundred and thirty-six convalescent psychiatric patients completed the survey. The participants’ mean age was 32.74 (SD = 14.94), and 94 (69.12%) were female. Over 60% were not married, and 46.32% were patients who held an undergraduate degree. A total of 38.97% of the patients were working, and 66.18% had an annual income at less than 60,000 RMB. A larger number of the respondents had major depressive disorder (33.09%), followed by bipolar disorder (19.12%) and schizophrenia (11.65%), with the average duration of disease for 5.73 years. Further information about sociodemographic and clinical aspects refer to Table 1.

**Table 1.** General demographic information of participants,
|                        | N   | %    |
|------------------------|-----|------|
| **Gender**             |     |      |
| Male                   | 42  | 30.88% |
| Female                 | 94  | 69.12% |
| **Marital status**     |     |      |
| Married                | 48  | 35.29% |
| Unmarried              | 88  | 64.71% |
| **Education level**    |     |      |
| Primary                | 3   | 2.21%  |
| Junior high school     | 19  | 13.97% |
| High school            | 42  | 30.88% |
| University             | 63  | 46.32% |
| Postgraduate or above  | 9   | 6.62%  |
| **Work status**        |     |      |
| Student                | 35  | 25.74% |
| Working                | 53  | 38.97% |
| Unemployed             | 48  | 35.29% |
| **Annual income ($)**  |     |      |
| Less than sixty thousand | 90 | 66.18% |
| More than sixty thousand | 46 | 33.82% |
| **Diagnose**           |     |      |
| Depressive disorder    | 45  | 33.09% |
| Bipolar disorder       | 26  | 19.12% |
| Schizophrenia          | 24  | 17.65% |
| Anxiety                | 14  | 10.29% |
| Obsessive-compulsive disorder | 6 | 4.41 |
| Dissociative disorders | 2   | 1.47%  |
| Others                 | 19  | 13.97% |

|                        | Mean ± sd    |
|------------------------|--------------|
| Age                    | 32.74 ± 14.94|
| Duration of disease    | 5.73 ± 7.129 |

2. Questions related to COVID-19 and its impacts

Table 2 illustrates that most participants (89.71%) fully acquired the fundamental knowledge about the COVID-19 and what precautionary measures were available. A large proportion of the participants (91.91%) considered they had enough protective equipment. Except for the sleep duration, which rated by 61 participants (44.85%) as 'not satisfied', participants considered their interpersonal relationship (51.47%), exercise time (44.85%), and general state...
(46.32%) were in fair condition. Moreover, 91 participants (66.91%) reported that they thought the events were neutral during this period.

**Table 2.** Potential factors related to SRQ score.
|                          | N(%) | SRQ score | χ2/Z | P-value |
|--------------------------|------|-----------|------|---------|
|                          |      | Normal    | Abnormal |
|                          |      | (<8)      | (≥8)  |
| Gender                   |      |           |       |         |
| Male                     | 42(30.88) | 30(71.43) | 12(28.57) | 0.963 | 0.326* |
| Female                   | 94(69.12) | 59(62.77) | 35(37.23) |       |        |
| Marital status           |      |           |       |         |
| Married                  | 48(35.29) | 38(79.17) | 10(20.83) | 6.179 | 0.013* |
| Unmarried                | 88(64.71) | 51(57.95) | 37(42.05) |       |        |
| Education level          |      |           |       |         |
| Primary                  | 3(2.21)  | 2(66.67)  | 1(33.33)  | -0.508 | 0.611* |
| Junior high school       | 19(13.97) | 13(68.42) | 6(31.58)  |       |        |
| High school              | 42(30.88) | 26(61.90) | 16(38.10) |       |        |
| University               | 63(46.32) | 40(63.49) | 23(36.51) |       |        |
| Postgraduate or above    | 9(6.62)  | 8(88.89)  | 1(11.11)  |       |        |
| Work status              |      |           |       |         |
| Student                  | 35(25.74) | 15(42.86) | 20(57.14) | 10.868 | 0.004* |
| Working                  | 53(38.97) | 40(75.47) | 13(24.53) |       |        |
| Unemployed               | 48(35.29) | 34(70.83) | 14(29.17) |       |        |
| Annual income (RMB)      |      |           |       |         |
| More than sixty thousand | 46(33.82) | 38(82.61) | 8(17.39)  | 9.059  | 0.003* |
| Less than sixty thousand | 90(66.18) | 51(56.67) | 39(43.33) |       |        |
| Medication compliance    |      |           |       |         |
| Prescribed medication    | 104(76.47) | 70(67.31) | 34(32.69) | 3.662  | 0.16*  |
| Self-management          | 19(13.97) | 9(47.37)  | 10(52.63) |       |        |
| Abandon                  | 13(9.56)  | 10(76.92) | 3(23.08)  |       |        |
| Enough self-protect equipment | |      |       |         |
| Yes                      | 125(91.91) | 84(67.20) | 41(32.80) | 2.114  | 0.146* |
| No                       | 11(8.09)  | 5(45.45)  | 6(54.55)  |       |        |
| Sleep duration           |      |           |       |         |
| Quite satisfied          | 1(0.74)  | 0(0.00)   | 1(100.00) | -5.431 | <0.001* |
| Satisfied                | 11(8.09)  | 4(36.36)  | 7(63.64)  |       |        |
| Acceptable               | 49(36.03) | 20(40.82) | 29(59.18) |       |        |
| Dissatisfied             | 61(44.85) | 53(86.89) | 8(13.11)  |       |        |
| Quite dissatisfied       | 14(10.29) | 12(85.71) | 2(14.29)  |       |        |
| Interpersonal relationship | Quite satisfied | - | - | - | -4.481 | <0.001* |
|---------------------------|-----------------|---|---|---|--------|--------|
| Satisfied                 | 9(6.62)         | 2(22.22) | 7(77.78) |          |        |
| Acceptable                | 70(51.47)       | 38(54.29) | 32(45.71) |          |        |
| Dissatisfied              | 44(32.35)       | 38(86.36) | 6(13.64)  |          |        |
| Quite dissatisfied        | 13(9.56)        | 11(84.62) | 2(15.38)  |          |        |

| Exercise time             | Quite satisfied | - | - | - | -4.411 | <0.001* |
|---------------------------|-----------------|---|---|---|--------|--------|
| Satisfied                 | 25(18.38)       | 8(32.00) | 17(68.00) |          |        |
| Acceptable                | 61(44.85)       | 39(63.93) | 22(36.07) |          |        |
| Dissatisfied              | 39(28.68)       | 35(89.74) | 4(10.26)  |          |        |
| Quite dissatisfied        | 10(7.35)        | 7(70.00)  | 3(30.00)  |          |        |

| Special events            | Quite negative  | - | - | - | -5.697 | <0.001* |
|---------------------------|-----------------|---|---|---|--------|--------|
| Negative                  | 8(5.88)         | 0(0.00)  | 8(100.00) |          |        |
| Acceptable                | 29(21.32)       | 10(34.48) | 19(65.52) |          |        |
| Positive                  | 91(66.91)       | 72(79.12) | 19(20.88) |          |        |
| Quite positive            | 5(3.68)         | 5(100.00) | 0(0.00)   |          |        |

| General condition         | Quite satisfied | - | - | - | -5.456 | <0.001* |
|---------------------------|-----------------|---|---|---|--------|--------|
| Satisfied                 | 10(7.35)        | 2(20.00) | 8(80.00)  |          |        |
| Acceptable                | 63(46.32)       | 33(52.38) | 30(47.62) |          |        |
| Dissatisfied              | 52(38.24)       | 46(88.46) | 6(11.54)  |          |        |
| Quite dissatisfied        | 9(6.62)         | 8(88.89)  | 1(11.11)  |          |        |

|                         | Normal  | Abnormal | t     | P-value |
|-------------------------|---------|----------|-------|---------|
| N                       | 89      | 47       |       |         |
| Age                     | 34.80±14.34 | 28.83±15.42 | 2.248 | 0.026** |
| The duration of disease | 5.62±6.20    | 5.94±8.70    | -0.247| 0.806** |

SRQ=Self-Report Questionnaire

* Chi-square test
** T-test
3. SRQ score of participants and the factors associated with it

Overall there were 47 participants (34.5%) scored eight or higher. The chi-square test was performed to identify the potential factors related to this result. Working or marital status, and annual income were significantly associated with the higher score in SRQ, whereas other factors inclusive of gender, medication compliance or sufficient self-protect equipment did not remarkably impact the SRQ score. Similarly, there was a link between sleep duration, interpersonal relationship, exercise time, special events, general condition and SRQ grade, but no statistically significant correlation between patients’ awareness about COVID-19 or education level and psychological effects revealed by SRQ.

Regarding other sociodemographic characteristics, the independent t-test detected being younger was a risk factor for getting a higher score in SRQ, whereas the duration of disease was not.

In the next analysis step, we included all variable with statistically significant differences among the convalescent psychiatric patients in the binary logistic regression. The results demonstrated the robust relationship between SRQ score and personal annual income (OR=3.340, 95%CI:1.135-9.831) or special events (OR=0.231, 95%CI:0.100-0.534). Patients with less annual income and had negative life events were significantly more likely to endorse higher SRQ score. Furthermore, a higher score moderately correlated with sleep duration (OR=0.506, 95%CI:0.259-0.987) and general conditions (OR=0.395, 95%CI:0.172-0.905). This result suggests that patients who reported to sleep less and thought they were in bad general conditions tend to be more concerned. Among these factors, sleep duration and general conditions connected with annual income, which indicated patients who earn more than 60,000 RMB each year sleep more and feel more content with their conditions.

Discussion

This study indicated that one-third of participants present with mental distress even when China was recovering from the COVID-19 pandemic. In the earlier stage of this pandemic, several studies conducted to estimate the level of mental distress induced by COVID-19 were inconclusive. Some research revealed that the symptoms of psychiatric patients worsened\textsuperscript{14,15}. Besides, as a vulnerable group of the population, they showed significantly more mental distress than people without psychiatric illnesses\textsuperscript{16}. However, one study showed no noteworthy difference in the distress level between patients with severe mental illness and the general population\textsuperscript{17}. In another study, anxiety disorder patients did not exhibit with marked psychological impact secondary to COVID-19\textsuperscript{18}. According to Gao et al., 43.2% of patients with emotional disorder were affected, similar to our finding\textsuperscript{13}. One explanation we proposed would contribute to this result: negative news like the virus might strike again during the upcoming winter trigger a series of emotional stress responses including anxiety and fear since these stable patients could easily access the Internet and media. Patients with psychiatric diseases tended to hold less positive anticipation for a future epidemic prospect\textsuperscript{13}, resulting in worries about their routine medical consultant and drug compliance, which are critical in their convalescence, would be disrupted again.

According to our study, unmarried status correlated with a higher SRQ score. This result contrasted with those obtained in pre-existing mental disorder patients\textsuperscript{19}. Convalescent psychiatric patients who remained single might have worse personal and more trouble maintaining relationships at baseline, making them easier to be affected. A prior national survey indicated that those who were single or widowed or divorced were less likely to seek mental health service\textsuperscript{20}. Without timely help-seeking behaviour, convalescent psychiatric patients, in particular, who are
single, might struggle more to cope with the accumulating adverse emotional effects induced by COVID-19. However, we found the marital status had no statistically significant effect on patients' SRQ score with an additional analysis conducted, which may partially because some of our participants were students. Age, another influencing factor concerning anxiety caused by the pandemic\textsuperscript{8}, had its role to play in increasing our patients' SRQ score. Compared with older age patients, younger patients had less experience and weaker psychological self-regulation ability when faced this health crisis might be the reason.

It is also showed that events that happened during this period affected patients' psychological distress level. In our study, we made no restriction on the types of the event, intending to focus on the psychological impact they might have on our participants. A large body of research had provided evidence that negative life events were partly responsible for the onset of mental disorder\textsuperscript{21}\textsuperscript{22}. Moreover, stressful life events and the first appearance of neuroses and depression revealed a strong association\textsuperscript{23}. In contrast, positive life events have been thought to either directly protect patients from the distress feeling or buffer the adverse effect induced by negative events. During this particular period, negative events like death in the family or medical emergencies due to COVID-19 infection, and financial hardship secondary to the pandemic can act as exact stressors which impact patients' mental stability, while positive events might improve their quality of life. We observed patients who reported shorter sleeping duration and worse self-rated general condition had a higher SRQ score response. Emotional events easily caused sleep disturbance and vice versa\textsuperscript{24}. One recent study suggested that participants reported lower posttraumatic stress symptoms during COVID-19 outbreak when they had a better sleep\textsuperscript{25}. Literature indicated that subjects who had insomnia or short sleep duration presented higher odds of developing chronic mental health symptoms\textsuperscript{26}. Our study was consistent with previous findings. Keeping up a daily routine is vital for dealing with the crisis. COVID-19 outbreak disrupted most people's daily life. They were encouraged to stay at home instead of gathering with families and friends, which people usually do during the Spring Festival, to prevent the virus from spreading. After the end of the holiday season, adults had to work from home while children had to have online teaching sections instead of going back to school. A national lockdown replaced the 7-days holiday with the uncertainty of when life will go back to normal. People were stressed, worrying about their jobs and their children's education while taking care of household chores. With increased interaction between work and private lives, people may have less time to sleep.

School children and adolescent, in particular, may feel more anxious because they had to learn in a completely different environment, which leads to sleep difficulties\textsuperscript{26}. Moreover, now the companies and schools reopened, convalescent psychiatric patients may need more time for adaption. Besides, working patients might be anxious about their financial security with fears of a new recession following this pandemic. Times like this was prone to trigger negative emotion amongst patients who used to be in stable recovery, and their sleep duration could be affected. If the patients experienced symptoms fluctuation, naturally, their self-perceived condition would be worse.

One impressive result of our study was annual income remarkably associated with self-report psychological impacts. The higher socioeconomic status convalescent psychiatric patients were in, the less worried they felt. Base on the income survey published in 2020, the average earnings for citizens from Zhejiang Province, where most of our participants lived, was 60,000 RMB\textsuperscript{27}. Therefore, we set this amount as the point by which we dived participants into two groups, the high-income one and the low-income one. The COVID-19 outbreak affected global economies and inevitably interfered every aspect of human life. Primary sectors, secondary sectors, and tertiary sectors all suffered from heavy losses because of the implement border shutdown, travel control and strict home confinement measures\textsuperscript{5}. 


From an economic perspective, people in the low-income group might lack resources to cope with external risks. Even when the COVID-19 pandemic seemed to get closer to an end, they may be concerned about the economic burden of the family and family members' well-being as well, which created significant challenges for their coping strategies. Their economic disadvantage, including decreased wages and job loss due to the post-pandemic effect, damaged the treatment continuance. Convalescent psychiatric patients from the low-income group might prefer to spend money on daily expenditure rather than medications if they had reduced personal disposable income. Also, they might not get sufficient protective equipment because of financial strain. Another reason would be that their unstable living conditions make them more susceptible to COVID-19 infection. Moreover, we found out that higher income was associated with longer sleep duration and more content feeling about the general condition in stable patients. Because sleep duration and general condition of the patients affected how they reacted to the pandemic, we rationally suggested that patients with higher income would report fewer problems on those two aspects and had a lower distress level.

This study has several limitations. First of all, since our research had a modest sample size of 136 participants and lacked a control group, caution is required in interpreting the results. Second, the way we used to collect data excluded convalescent psychiatric patients who have less access to digital technologies such as smartphones or the Internet and, therefore, our findings may not adequately reflect trends seen throughout the whole targeted population. Third, we adopted self-reported psychometric tools that have common drawbacks of such instruments. Finally, because the causal relationship indicated in our study was based on cross-sectional data, more research should be carried out to clarify the reason behind its existence.

To the best of our knowledge, this is one of the few studies that focused on convalescent psychiatric patients and whether COVID-19 pandemic still has psychological impacts on them.

**Conclusions**

According to our study, eight months into the COVID-19 pandemic, there was still more than a third of the participants reported they were psychologically affected by this widespread virus. Furthermore, this result was also related to less annual income. This finding stressed the need to offer comprehensive interventions and medical service for convalescent psychiatric patients during pandemic's peak and the necessity to provide closer follow-up and financial support in the late stage of this health crisis. Future studies should be conducted with a longitudinal design to study the psychological impact in this group of patients over time.

**List Of Abbreviations**

W.H.O. World Health Organization

SRQ Self-Reporting Questionnaire

**Declarations**

**Ethical approval and consent to participate**

All participants signed written informed consent and all procedures contributing to this study complied with the relevant institutional committees’ ethical standards. This study was approved by Tongde hospital of Zhejiang Province Ethics Board.
Consent for publication

Not applicable.

Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors’ contribution

XR, WH and YM conceived the research idea. HP, TH and XW helped improve the initial idea. YM, TH and XW conducted data collection. XR and WH handled data analysis and wrote the first draft of the manuscript. All authors have read and approved the final manuscript.

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