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Impact of COVID-19 outbreak on posttraumatic stress in patients with psychiatric illness

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ABSTRACT

The present study aimed to examine the prevalence of posttraumatic stress response in reaction to the COVID-19, including posttraumatic-stress-disorder-like symptoms (PTSD-like symptoms) and depressive symptoms, among patients with pre-existing psychiatric illness. The socio-demographic and psychological correlates of PTSD-like symptoms were also examined. A total of 193 participants were recruited. More than 45% of the respondents reported significant PTSD-like symptoms related to the COVID-19; this group of patients also had a high level of pandemic-related depressive symptoms. High level of PTSD-like symptoms were predicted by rumination on concerns about the outbreak of COVID-19 and feeling of social isolation. They were also associated with hypervigilance to cues related to the pandemic. Our results suggested that the pandemic had taken a psychological toll on people living with psychiatric illness. Further research is needed to understand the development and mechanism of traumatic stress reaction in response to a prolonged infectious disease outbreak among this vulnerable population. Clinical attention is also called to mitigate the psychiatric sequalae of the pandemic in this vulnerable group of people.

1. Introduction

The World Health Organization declared the coronavirus disease 2019 (COVID-19) a pandemic on 11th March 2020 (World Health Organization, 2020). As of 20th May 2021, the virus had swiftly spread around the globe, resulting in more than 163 million confirmed cases and deaths of more than 3.3 million (European Centre for Disease Prevention and Control, 2021). The pandemic not only burdens the healthcare system but also takes a toll on public mental health. Elevated rates of psychological distress, anxiety, or depressive symptoms have been obtained in Germany, the US, the UK, and Hong Kong by comparing population-based surveys data before and during the pandemic (Bäuerle et al., 2020; McGinty et al., 2020; Pierce et al., 2020; Zhao et al., 2020). Particular concern has been raised on the development of PTSD symptoms in response to COVID-19, which is a life-threatening event given the potentially fatal nature of the disease, inadequate understanding of its spreading mechanism, and the unavailability of an effective cure (Dutheil et al., 2020). Previous studies have found that infectious disease outbreaks, akin to major disasters, can be traumatizing for some individuals leading to the development of PTSD. For instance, it was found that the prevalence rate of PTSD was more than 20% among the survivors of Ebola virus disease and severe acute respiratory syndrome (SARS) two years or later since the pandemic (Bah et al., 2020; Mak et al., 2009). Not only does the pandemic affect the patients who are at imminent threat to their physical health, but it can also be a collective traumatic experience for ordinary people. Lau et al., (2005) found that six months after the SARS epidemic, about 16% of Hong Kong people showed signs of posttraumatic stress symptoms. Recently, a meta-analysis of pooled data from studies that investigated the stress reactions in response to COVID-19 suggested that about one in four adults were experiencing posttraumatic stress symptoms associated with the pandemic (Cooke et al., 2020).

If the pandemic could adversely affect the wellbeing of the general public, one would expect that the negative impact would be even greater among people with pre-existing psychiatric disorders. It has been suggested that the reduced access to mental health service, disruption of daily routine, and unavailability of social support due to social distancing and isolation may contribute to the exacerbation of pre-existing symptoms and worsening of mental health (Kozloff et al., 2020; Montemurro, 2020; Moreno et al., 2020). Further, pre-existing psychiatric illness is a documented pre-trauma risk factor for PTSD

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(for a review, see DiGangi et al., 2013). Research findings suggest that the cognitive vulnerability factors for anxiety and depression might serve as vulnerability factors for PTSD (for a review, see Elwood et al., 2009). Pulling these together, it is reasonable to posit that pre-existing psychopathology that has shared vulnerability factors with PTSD (for example rumination) might increase reactivity to stress that accompanies the exposure to the pandemic, and in turn affect the individual's response which influences the development of PTSD symptoms.

Emerging evidence has shown that psychiatric patients reported high level of PTSD-like symptoms related to COVID-19. It should be noted that we cautiously adopted the term "PTSD-like symptoms" because the following two studies used the Impact of Event Scale-Revised (IES-R; Weiss and Marmar, 1997) which did not parallel the current Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5; American Psychiatric Association, 2013) criteria of PTSD but its predecessor. In the study conducted by Hao et al. (2020) in China, it was found that among 76 psychiatric patients, over 40% of them had clinically significant PTSD-like symptoms (scored 18 or above on the IES-R). Further, when compared to healthy controls, psychiatric patients had significantly higher scores in the IES-R. In another non-peer-reviewed preliminary report, Poyraz et al. (2020) conducted an online survey among 485 psychiatric outpatients in Turkey. The cutoff score of 33 or above in the IES-R was used to define a probable diagnosis of PTSD. It was found that up to 32.6% met the criteria. The high rate of pandemic-related PTSD-like symptoms in people with pre-existing psychiatric problems is worth attention, but there is a shortfall in empirical literature in this area. A better understanding of the mental health sequelae of COVID-19 will help clinicians to uncover the service needs of this vulnerable population.

The aim of the present study was twofold. Firstly, to examine the prevalence of posttraumatic stress response in reaction to the COVID-19, including PTSD-like symptoms and depressive symptoms, among patients with pre-existing psychiatric illness. Secondly, to examine the socio-demographic and psychological correlates of PTSD-like symptoms.

2. Methods

2.1. Participants

The target participants were psychiatric outpatients in a public hospital in Hong Kong who were concurrently receiving clinical psychology services. The clinic served patients who were aged 16 years old or above, with various psychiatric diagnoses. The inclusion criteria were: (1) having scheduled a follow-up appointment for outpatient clinical psychology service in the period between mid-February and end of June 2020 and (2) the ability to read/understand Chinese or English.

2.2. Data collection

The data collection period was between 6 May 2020 and 30 June 2020. Participants were invited to join the study either by (1) on-site recruitment at the clinic or via (2) online recruitment if they previously consented to receive information from our department through electronic means. Information of the study was also delivered by the above two means. Patients who were under 18 years old were only accepted for on-site recruitment, so that the purpose of the present study could be explained to them in the presence of their parents/legal guardians. Participants could choose to fill in the consent form and the survey either through paper-and-pencil format or web-based format via Google Forms. This study was approved by the Research Ethics Committee (Kowloon Central / Kowloon East) of Hospital Authority, HKSAR (Ref.: KC/KE-20-0101/ER-4).

2.3. Measures

2.3.1. Overview of the questionnaire

The present study was part of a larger research project. Thirty-nine items in the questionnaire were relevant to the present study. There were fifteen items that covered the demographic data and questions that assessed patients' psychological response to the COVID-19 outbreak, such as whether the participant felt socially isolated, ruminated, and dwelled on concerns about COVID-19, etc. The 2-item Chinese version of Patient Health Questionnaire-2 (PHQ-2) and the 22-item Chinese version of the IES-R were also embedded in our questionnaire to assess the psychological impact related to the pandemic. To lessen the respondents' concern for privacy, the questionnaire was anonymous and did not contain any sensitive data including their psychiatric diagnosis.

2.3.2. Impact of event scale-revised (IES-R)

IES-R is a 22-item self-report questionnaire used to assess psychological stress reactions in response to a traumatic event (Weiss and Marmar, 1997, 2004). It is a well-validated and widely used instrument to measure PTSD-like symptoms in the Asian population (Wang et al., 2021). It is rated on a 5-point Likert scale. The total score ranges from 0 to 88. In the present study, the Chinese version of the IES-R (Wu and Chan, 2003) was used to assess the PTSD-like symptoms in response to the COVID-19 outbreak. The Chinese version of the IES-R has been reported to have good psychometric properties (Wu and Chan, 2003). A universal cutoff score for IES-R was not established, as the response could vary with multiple factors, including the nature and severity of referenced traumatic event, as well as the population examined respectively (Weiss and Marmar, 2004). Several cut-off scores have been suggested for the IES-R in response to public health crises. For instance, Lee et al. (2006) adopted 26 or above as an indicator of "clinically significant PTSD" in a study on the psychological impact of SARS among Hong Kong citizens. Among studies related to COVID-19, Hao et al. (2020) adopted 18 or above for "PTSD-like symptoms" and 24 or above as "diagnosis of PTSD", while some other researchers adopted a cutoff score of 33 or above as indicating "probable PTSD" (Fekih-Romdhane et al., 2020; Poyraz et al., 2020). In the present study, we adopted a cut-off score of 26, which was in line with a pervious local study (Lee et al., 2006); it also represented a conservative indicator of significant PTSD-like symptoms that might warrant clinical attention.

2.3.3. Patient health questionnaire-2 (PHQ-2)

PHQ-2 (Kroenke et al., 2003) is a 2-item self-report questionnaire that measures two prominent depressive features, namely depressed mood and anhedonia. It is rated on a 4-point Likert scale. The total score ranges from 0 to 6. A score of 3 or above indicates that major depressive disorder is likely. (Kroenke et al., 2003). In the present study, the Chinese version of PHQ-2 was used to assess depressive symptoms related to the outbreak of COVID-19. The Chinese version of the PHQ-2 has been shown to have good reliability and validity for local samples (Yu et al., 2011).

2.3.4. Statistical analysis

Descriptive statistics were conducted for demographic characteristics. Chi-square tests, independent-samples t-test, and Mann-Whitney U tests were carried out to compare the difference in demographic and psychological characteristics between participants with different levels of PTSD-like symptoms. Logistic regression analysis was used to determine the relationship between high PTSD symptomatology and multiple socio-demographic/psychological factors. All tests were two-sided with a significance level of p-value less than 0.05. All analyses were performed by using the Statistical Package for the Social Science (IBM SPSS for Windows. Version 23).

3. Results

3.1. Demographic characteristics

Among the 549 eligible participants, 193 consented to participate in the study (response rate = 35%). Table 1 gives an overview of the demographic characteristic of the respondents. Among them, 72% were female, 88.1% were under 61 years old, 14.5% were living alone, and 34.4% reported change in employment status during the pandemic. Regarding experience associated with COVID-19, none of them had been a confirmed case of COVID-19, 1.6% reported that someone in their social network had been a confirmed case of COVID-19, and 7.3% reported that either they or someone in their social network had been quarantined.

3.2. Prevalence of posttraumatic stress and depressive symptoms

On average, the participants reported significant PTSD-like symptoms (mean IES-R score = 26.61, SD = 17.95). Eighty-five participants (45.2%) scored above the cut-off scores of 26 in the IES-R. The mean score of PHQ-2 was 2.62 (SD=1.83). Ninety participants (46.6%) scored 3 or above on the PHQ-2, suggesting that their depressive symptoms needed clinical attention. Overall, 77.6% of the participants reported that the emotional problems because of the COVID-19 outbreak had interfered with their daily functioning.

3.3. Differences between high and low posttraumatic stress group

The respondents were divided into the high posttraumatic-stress-symptom group (High PTS group) and the low posttraumatic-stress-symptom group (Low PTS group) based on the IES-R cutoff score for subsequent analysis (see Table 2). Results revealed that the high PTS group, whose respondents endorsed significant PTSD-like symptoms that warranted clinical attention, is more likely to be living alone ($p < .05$), and having experience with quarantined (either self, friends or relatives have been quarantined) ($p < .05$), than the low PTS group. Further, participants in the high PTS group were found to have significantly higher PHQ-2 scores than the low PTS group ($p < 0.001$). In addition, it was found that the high PTS group had significantly higher scores on "hypervigilant towards cues related to the outbreak of COVID-19" ($p < 0.001$), "feeling socially isolated" ($p < 0.001$), "ruminated and dwelled on concerns about COVID-19" ($p < 0.001$), and "excessive exposure to news related to the outbreak of COVID-19" ($p < 0.001$). No significant differences were found between groups in age, gender, change of employment condition, the experience of quarantine, and knowing someone in their social network who had COVID-19.

Table 1
Demographic characteristics of the participants.

Age range	n (%)
16-20	14 (7.3%)
21-30	28 (14.5%)
31-40	41 (21.2%)
41-50	41 (21.2%)
51-60	46 (23.8%)
61-70	20 (10.4%)
>70	3 (1.6%)
Gender	
Male	54 (28.0%)
Female	139 (72.0%)
Living Status	
Living alone	28 (14.5%)
Living with family or friends	165 (85.5%)
Impact on employment condition	
No impact	118 (65.6%)
Had impact (forced to take paid leave / unpaid leave / time off / underemployed / laid off)	62 (34.4%)
Have been infected with COVID-19	
Yes	0 (0%)
No	193 (100%)
Someone in their social network have been infected with COVID-19	
Yes	3 (1.6%)
No	190 (98.4%)
Have been quarantined or someone in their social network have been quarantined	
Yes	14 (7.3%)
No	179 (92.7%)

Table 2
Bivariate analysis on factors associated with above-cut-off IES-R scores.

Characteristics	χ^2 (df, N)	p	t (df, N)	p	U	p
Age (60 or below vs above 60)	.207 (1, N = 188)	.649				
Gender (female vs male)	2.18 (1, N = 188)	.139				
People in social network with COVID-19 (yes vs no)	.724 (1, N = 188)	.395				
Self, friends or relatives have been quarantined (yes vs no)	4.59 (1, N = 188)	.032				
Living alone (yes vs no)	5.86 (1, N = 188)	.016				
Impact on employment condition (yes vs no)	1.19 (1, N = 177)	.276				
PHQ-2 score			20.61 (186, N = 188)	<.001		
Hypervigilant towards cues related to the outbreak of COVID-19					1588.0	<.001
Feeling socially isolated					1458.0	<.001
Ruminating and dwelling on concerns about COVID-19					1320.5	<.001
Excessive exposure to news related to the outbreak of COVID-19					2486.5	<.001

3.4. Factors associated with posttraumatic stress

To further determine the socio-demographic and psychological factors that were associated with elevated IES-R scores, logistic regressions were conducted. The model fit was supported by the omnibus test, χ^2 (9, $N = 176$) = 121.922, $p < .001$, and the Hosmer-Lemeshow test, χ^2 (8, $N = 176$) = 4.658, $p = .793$. The model accounted for 66.8% of the variance. As shown in Table 3, "feeling socially isolated" (OR = 3.153, $p < 0.001$) and "ruminated and dwelled on concerns about COVID-19" (OR = 6.666, $p < 0.001$) were predictive of above-cutoff IES-R scores. The other variables as shown in Table 3 were not found to predict high PTSD-like symptoms.

Table 3
Logistic regression results on factors associated with above-cut-off IES-R scores.

Predictors	Exp(*b*)	95% CI for Exp (*b*)	
		Lower	Upper
Age (60 or below vs above 60)	2.467	.467	13.034
Gender (female vs male)	2.140	.743	6.16
People in social network with COVID-19 (yes vs no)	.000	.000	-
Self, friends or relatives have been quarantined (yes vs no)	.248	.023	2.657
Living alone (yes vs no)	1.451	.360	5.857
Impact on employment condition (yes vs no)	1.978	.716	5.467
Feeling socially isolated	3.153***	1.862	5.338
Ruminating and dwelling on concerns about COVID-19	6.666***	3.123	14.230
Excessive exposure to news related to the outbreak of COVID-19	1.016	.591	1.749

Note: Exp = exponentiation of the B coefficient; CI = confidence interval; ***P < 0.001.

4. Discussion

In the present study, we found that more than 45% of the respondents reported significant PTSD-like symptoms related to the COVID-19; this group of patients also had a high level of pandemic-related depressive symptoms. Our results add to a small literature showing that people with pre-existing psychiatric illness might have experienced substantial psychological distress in the pandemic (Hao et al., 2020; Poyraz et al., 2020).

Our study extends the findings from previous studies by investigating the relationship between high PTSD symptomatology and its correlates. We found that hypervigilance towards cues related to the outbreak of COVID-19 was associated with a higher level of PTSD-like symptoms. Moreover, consistent with prior literature which documented an association between PTSD features and rumination (for a review, see Elwood et al., 2009), we also found that ruminating and dwelling on concerns about COVID-19 is a significant predictor of PTSD-like symptoms. These findings are in line with the cognitive model of PTSD, which suggests that maladaptive cognitive processing, including selective attention to threat cues and rumination, may trigger the re-experiencing symptoms and maintain problematic appraisal of the trauma (Ehlers and Clark, 2000). Given that people with pre-existing psychiatric illness may share similar cognitive vulnerability factors that may contribute to PTSD symptomatology, it remains possible that they may have higher reactivity to stress and employ maladaptive cognitive strategies during the pandemic, increasing their risk to develop PTSD symptoms.

We also found that feeling socially isolated was a predictor of PTSD-like symptoms. In Hong Kong, despite that the more stringent step of lockdown was not adopted, people were encouraged to stay at home and keep social distancing measures. Perhaps, such measures might still have a deleterious impact on social support and bonding, leading to a heightened sense of isolation. In the review of Ozer et al (2003), it was found that perceived posttrauma social support was a predictor of PTSD. Given the prolonged nature of the pandemic, our finding may suggest that peritraumatic social support could also be important in the development of PTSD-like symptoms. Further investigation in this area is warranted.

Our study yielded several unexpected results. First, it was found that gender, age, change of employment status, the experience of quarantine, and knowing someone in their social network who had COVID-19 were not predictors of high level of PTSD-like symptoms. These factors have been hypothesized as probable risk factors for PTSD related to COVID-19 (Boyraz and Legros, 2020) with some empirical support in the general population (Fekih-Romdhane et al., 2020; Liu et al, 2020) and in the psychiatric population (Poyraz et al., 2020). Nevertheless, we also noted that in the Hao et al. study (2020), age and gender were not found to be significant predictors of posttraumatic stress in the pandemic. Such inconsistent findings can perhaps be due to the instability of results arising from a small number of studies in this area, especially on psychiatric patients. Further, in our study, only a small number of the participants reported having experience with quarantine or knowing someone who had been infected. The statistical power of the analysis might perhaps be compromised. Having said that, there remains a possibility that the psychological sequelae of a pandemic might be more widespread among different groups of people who have pre-existing psychiatric illness, given the abovementioned vulnerability factors. This hypothesis needs further investigation to be confirmed.

The second unexpected result was that excessive exposure to news related to the pandemic was not a predictor of high posttraumatic stress. It was not in agreement with previous findings, which show that hours of media coverage of the community crisis were associated with higher PTSD symptomatology related to the COVID-19 (Fekih-Romdhane et al., 2020) and the September 11 terrorist attack (Schlenger et al., 2002). The discrepancy might partly be explained by the setup of the question in different studies. In our study, participants rated on a four-point Likert scale regarding whether they had excessive exposure to news related to COVID-19 in the past two weeks. This single item might not be sensitive enough to explore the impact of repeated pandemic-related media consumption.

The study has several limitations. First, as mentioned above, the use of a single item to assess the feeling of isolation, hypervigilance, rumination, and media exposure to COVID-19 related news may not be able to capture the complexity of the constructs being measured. However, the decision to use a more concise questionnaire was to enhance the response rate in a clinical setting. In fact, when compared with the two similar studies on psychiatric patients published by Hao et al. (2020) and Poyraz et al. (2020), our study achieved the highest response rate (35% vs. 11.3% and 18% respectively). Second, due to the exploratory nature of this study, the complex relationship between psychological factors and pandemic-related trauma response could not be elucidated. Nonetheless, our preliminary findings may still lay the foundation for future research. Third, we did not obtain the respondents' premorbid psychiatric diagnoses and their severity, thus the differential mental health impact of COVID-19 on different disorders could not be studied. The lack of pre-COVID data on PTSD-like and depressive symptoms also made it difficult to ascertain whether the changes in symptoms was caused by the pandemic. Fourth, the present study did not include a measure for anxiety symptoms. Further exploration in this area would shed light on the overall psychological impact of COVID-19 among people with pre-existing psychiatric illness. Fifth, although the IES-R was widely used and well-validated, it did not correspond to the most updated diagnostic criteria of PTSD and it did not have a standardized cut-off score to indicate clinical severity. Sixth, this cross-sectional study can only provide a snapshot of the mental health impact of the pandemic on local psychiatric patients. We are cautious against making assumptions about the longstanding impact, as the symptom trajectory may change depending on various factors including the knock-on economic effects, personal resilience etc. Longitudinal studies on how the symptoms changed or developed in different stages of the pandemic will be needed. Finally, the generalizability of the findings may be limited by the small sample.

Notwithstanding its limitations, our results highlight the importance of understanding the posttraumatic stress in patients with pre-existing psychiatric illness in the light of the COVID-19 outbreak. Our findings not only have research implications, but also provide direction for clinical practice. We suggest that mental health professionals should be aware of the presence of the traumatic stress response, recognize the signs of the trauma, and take action to prevent the potential exacerbation of the PTSD-like and depressive symptoms in this vulnerable group of people. Particularly, helping people to understand the nature of initial posttraumatic stress response as normal response to a life-threatening pandemic would be beneficial. It might help to reduce the idiosyncratic negative interpretation of the symptoms which might have the

potential to worsen emotional distress. Further, helping the patients to deal with rumination and hypervigilance to cues related to the pandemic while ensuring adherence to behavioral advice will be worthwhile. Moreover, assisting patients to find new ways to stay in touch with people in their supportive network, including mental health professionals, will also help to mitigate the sense of isolation in the pandemic and possibly buffer the development of PTSD-like symptoms. Developing new means to help people maintain access to mental health care service, for instance telecare service, should also be considered. It can fill the gap in traditional face-to-face psychiatric care when social distancing measure is implemented. In the post-pandemic era, mental health service providers might also need to assist people to rebuild the necessary contact and activities that could help them to combat the persistent sense of isolation and enhance their mental health. Concerted efforts of researchers and clinicians are needed to deal with the potential challenge of PTSD, especially among people living with mental illness.

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CRediT authorship contribution statement

Travis C.M. Ting: Conceptualization, Methodology, Data curation, Formal analysis, Software, Writing - original draft, Writing - review & editing, Visualization. **Agatha W.S. Wong:** Conceptualization, Methodology, Formal analysis, Writing - review & editing. **W.S. Liu:** Conceptualization, Methodology, Formal analysis, Writing - review & editing. **Flora L.T. Leung:** Conceptualization, Supervision. **Michael T. Ng:** Writing - review & editing.

Declaration of Competing Interest

None.

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