

Longitudinal Examination of COVID-19 Public Health Measures on Mental Health for Rural Patients With Serious Mental Illness

Natalie B. Riblet, MD, MPH*,†; Susan P. Stevens, PhD*,§; Brian Shiner, MD, MPH*,†,‡;
Sarah Cornelius, BS*; Jenna Forehand, MD, MPH*; Robert C. Scott, MD, PhD*,§;
Bradley V. Watts, MD, MPH§,||

ABSTRACT

Introduction:

There is emerging evidence to support that the COVID-19 pandemic and related public health measures may be associated with negative mental health sequelae. Rural populations in particular may fair worse because they share many unique characteristics that may put them at higher risk for adverse outcomes with the pandemic. Yet, rural populations may also be more resilient due to increased sense of community. Little is known about the impact of the pandemic on the mental health and well-being of a rural population pre- and post-pandemic, especially those with serious mental illness.

Material and Methods:

We conducted a longitudinal, mixed-methods study with assessments preceding the pandemic (between October 2019 and March 2020) and during the stay-at-home orders (between April 23, 2020, and May 4, 2020). Changes in hopelessness, suicidal ideation, connectedness, and treatment engagement were assessed using a repeated-measures ANOVA or Friedman test.

Results:

Among 17 eligible participants, 11 people were interviewed. Overall, there were no notable changes in any symptom scale in the first 3-5 months before the pandemic or during the stay-at-home orders. The few patients who reported worse symptoms were significantly older (mean age: 71.7 years, SD: 4.0). Most patients denied disruptions to treatment, and some perceived telepsychiatry as beneficial.

Conclusions:

Rural patients with serious mental illness may be fairly resilient in the face of the COVID-19 pandemic when they have access to treatment and supports. Longer-term outcomes are needed in rural patients with serious mental illness to better understand the impact of the pandemic on this population.

INTRODUCTION

The COVID-19 pandemic has caused widespread, negative outcomes for society at large. This includes growing concerns about the risk for economic destabilization as well as social isolation.¹ Because these factors, in turn, are strongly associated with poor mental health outcomes,² there are notable fears that the current pandemic will result in short- and long-term negative harms on the social functioning of

the population.³⁻⁵ This concern also aligns with findings from prior pandemics and epidemics, including the 1918 influenza pandemic and the 2002-2004 SARS (Severe Acute Respiratory Syndrome) epidemic, where it was observed that suicide rates rose among the general population in the United States and in older adults in Hong Kong, respectively.⁵ Moreover, because suicide rates have already been on the rise in the last few decades in the United States, it is reasonable to expect that these problems will only be further exacerbated by the pandemic.⁴

When considering the potential negative impact of a public health emergency such as the COVID-19 pandemic on mental health, it is important to look at whether rural and urban populations may be differentially impacted.⁶ On one hand, rural communities may be at greater risk for adverse outcomes because they encounter greater barriers to accessing treatment, are more prone to social isolation and stigma, and have less access to technology for emotional support⁷⁻¹⁰ and reduced literacy.¹¹ Of course, patients with serious mental illness who live in rural areas may be especially at risk because physical distancing and fears of contagion may reinforce behaviors to isolate from others including health-care providers. On the other hand, rural communities may fair better during a pandemic because they are able to tap

*White River Junction Veterans Affairs Medical Center, White River Junction, VT 05009, USA

†Department of Psychiatry and Dartmouth Institute, Geisel School of Medicine at Dartmouth College, Hanover, NH 03755, USA

‡Mental Health National Center for PTSD, White River Junction, VT 05009, USA

§Department of Psychiatry, Geisel School of Medicine at Dartmouth College, Hanover, NH 03755, USA

||Systems Redesign and Improvement, VA Office of Systems Redesign and Improvement, White River Junction, VT 05009, USA

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into unique strengths such as self-sufficiency and close-knit communities.^{6,12} To date, there has been one large, cross-sectional study of mental health symptoms in the general U.S. adult population during the COVID-19 pandemic.¹³ This study found that the prevalence of mental health symptoms was similar across rural and urban settings.¹³

To the best of our knowledge, there remain several key gaps in the literature with regard to understanding the impact of the COVID-19 pandemic on rural populations. First, there has been limited study of mental health outcomes in U.S. rural populations.¹³ Second, there is a need for additional studies that examine changes in mental health symptoms before and after the onset of the pandemic. These data may help researchers to better understand who might be at greatest risk. Finally, there is a lack of qualitative work to better characterize the impact of the pandemic on diverse populations.¹⁴

In response, we examined the longitudinal effects of the COVID-19 pandemic and its related public health measures on rural patients with serious mental illness using a mixed-methods design. We compared outcomes pre- and post-pandemic. We hypothesized that exposure to the pandemic and its related public health measures would result in worse mental health outcomes including greater hopelessness and suicidal ideation. We also hypothesized that patients would report worse social connectedness and poorer engagement in treatment because the pandemic necessarily creates additional barriers to interacting with others and accessing care. Our findings provide insights into the public health effect of the COVID-19 pandemic on rural patients with serious mental illness and uncover areas in need of further study.

METHODS

Study Design and Participants

We conducted a longitudinal, mixed-methods study of rural patients with serious mental illness who recently accessed inpatient psychiatric treatment. We recruited patients from an existing study (Trial no. NCT04054947) that had enrolled 19 patients. Eligible patients were 18 years or older, able to speak English, had accessed care through the VA, and had been hospitalized on an inpatient mental health unit between October and December 2019. Furthermore, because two patients were lost to follow-up during the existing study, a total of 17 patients were eligible for recruitment for this longitudinal, mixed-methods study. We administered the MINI International Diagnostic Interview at baseline.¹⁵ In addition, we assessed patients for symptoms of hopelessness, social connectedness, suicidal ideation, and treatment engagement at three time points including baseline and 1- and 3-month follow-up. Notably, all data collection occurred between October 2019 and early March 2020 (before COVID-19 related stay-at-home orders). To assess the impact of COVID-19, we conducted a fourth assessment with participants between April 23, 2020, and May 4, 2020.

While the baseline assessments were administered in-person, the follow-up assessments were all administered over the phone. We made this decision in order to reduce travel burden on patients. The assessments that were included in our study can also be administered telephonically.

Ethics Approval

The study was reviewed and approved by the Veterans' Institutional Review Board of Northern New England, White River Junction Veterans Affairs Medical Center. Our study procedures followed the ethical standards as set forth by the revised 2018 Common Rule.

Consent to Participate

We obtained informed consent from all individual participants included in the study.

Study Procedures

We used a mixed-methods approach to understand the impact of the COVID-19 pandemic on rural patients with serious mental illness. We administered five standardized assessments that had been used in the parent study. These measures included the Beck Hopelessness Scale (BHS; a measure of hopelessness),¹⁶ the Interpersonal Needs Questionnaire (INQ)-15 (a measure of perceived burdensomeness and thwarted belongingness),¹⁷ the Partners in Health Scale (PIH; a measure of treatment engagement),¹⁸ and the Beck Scale for Suicidal Ideation (BSS; a measure of suicidal ideation).¹⁹ We measured suicide attempts using the Columbia Suicide Severity Rating Scale research version.²⁰ Higher scores on the BHS, INQ-15, and BSS indicate more severe hopelessness, perceived burdensomeness, thwarted belongingness, and suicidal ideation, respectively. Conversely, higher scores on the PIH suggest greater amounts of treatment engagement, more specifically self-management.

We developed and administered a semi-structured interview for this add-on study to understand the impact of the COVID-19 pandemic on treatment engagement and social connectedness. The interview consisted of eight questions and was broken into three sections (see Table SI). The "general" section asked about what (if any) effect the COVID-19 outbreak had on the person's life. The "social connectedness" section asked about what (if any) effect the COVID-19 outbreak had on the person's perceived social connectedness. The section also asked patients to report on their thoughts about the term "social distancing." The "treatment engagement" section asked about what (if any) effect the COVID-19 outbreak had on the person's engagement in mental health care. The semi-structured interview was administered over the phone.

Analysis of Quantitative Data

We summarized baseline measures using simple, descriptive statistics. We used a weighted average to summarize the prevalence of cumulative COVID-19 cases in the county

of residence around the time of the add-on assessment. Because we were interested in understanding the impact of the COVID-19 pandemic on the longitudinal trajectory of symptoms of hopelessness, connectedness, and suicidality in patients with serious mental illness who had been psychiatrically hospitalized in the past year, we tested for differences in mean scores across four points including 4-6 months before COVID-19 (October-December 2019), 3-5 months before COVID-19 (November 2019-January 2020), 1-2 months before COVID-19 (February-March 2020), and add-on assessments during the COVID-19 stay-at-home orders (April 23, 2020-May 4, 2020).

In preparation for our analysis, we first evaluated whether each of our measures followed a normal distribution using Shapiro-Wilk test. For measures (INQ-15; PIH) that followed a normal distribution, we then applied a repeated-measures ANOVA to evaluate for differences in means across time points. Because two measures (BHS and BSS) did not follow a normal distribution, we used the Friedman test instead to evaluate for difference in medians across time points. For each analysis, we considered that a two-sided P -value $<.05$ was significant.

If there was significant difference across time, we performed a post hoc, pair-wise comparison of means at the reference period and the follow-up points. If the sample means were normally distributed, we applied a paired t -test. Otherwise, we used a Wilcoxon signed-rank test. We accounted for multiple comparisons using the Holm-Bonferroni sequential method.²¹ We performed all analyses using Stata 14 (Stata Corp, College Station TX).

Analysis of Qualitative Data

We evaluated our qualitative data using directed content analysis, which aims to “validate or extend conceptually a theoretical framework or theory” (p. 1,281).²² Because we have an *a priori* conceptual framework, it was appropriate for us to apply directed content analysis to inform our initial coding schemes and assist in interpreting the relationships between codes. As suggested by the literature, we coupled the directed content analysis with an inductive approach in order to identify any additional relevant factors that were missed by our original conceptual framework. Four analysts (N.B.R., S.P.S., S.C. and J.F.) were involved in coding the data because this allowed for multiple perspectives and resolution of discrepancies through consensus. The four analysts reviewed their coding approach on a frequent basis. In order to minimize bias, each analyst independently read each of the transcripts in their entirety and highlighted all the relevant text that aligned with each of the dimensions (and sub-dimensions) as outlined in our conceptual framework. The analyst then coded this highlighted text. In the event that the analyst came across text that did not fit into this first round of codes, they used an inductive approach to assign a new code to the highlighted text. All codes were compiled into a comprehensive code

book and assigned to one of three categories including “positive” (i.e., favorable outcomes); “neutral” (i.e., no change), or “negative” (i.e., harmful outcomes). An additional category captured benefits and challenges of a sudden increase in use of telepsychiatry. We recorded the number of participants who endorsed a particular code.

RESULTS

Among 17 eligible participants, we were able to reach 11 people, all of whom consented to participation in this mixed-methods study. Other participants were unavailable to be interviewed or declined participation.

The 11 people who participated in the study completed all required assessments at each of the four time periods. There was no missing data.

Table S2 describes the baseline characteristics of the 11 patients at initial entry into the parent study between October and December 2019. The majority of participants were male, and the mean age was 48 years. Nearly 50% of participants were divorced or separated, and most participants were disabled. Furthermore, 73% of participants had a diagnosis of PTSD, 45.5% had a current diagnosis of major depressive disorder, 45.5% had a current diagnosis of bipolar affective disorder type 1, and 9.1% had a current diagnosis of a psychotic disorder. Alcohol use disorder was also fairly common. Most patients lived in New Hampshire or Vermont at the time of the stay-at-home orders. Notably, the weighted average prevalence of cumulative COVID-19 cases in county of residence was 154.6, markedly lower than those of neighboring hot spot states.

Impact of the Pandemic on Hopelessness, Connectedness, Suicidal Ideation, and Treatment Engagement

Although hopelessness, suicidal ideation, perceived burdensomeness, thwarted belongingness, and treatment engagement generally improved over time, the improvements occurred in the transition from inpatient to outpatient care (see Table I). Furthermore, only the decreases in perceived burdensomeness ($F(3,30) = 7.02, P = .001$) and suicidal ideation ($Q(10) = 22.6, P = .01$) were statistically significant. Both of these improvements occurred largely after hospital discharge.

Importantly, with respect to the COVID-19 pandemic, Fig. 1 shows that once patients transitioned to the outpatient setting (i.e., in period between 3 and 5 months before the COVID-19 stay-at-home order), there was no notable change in any symptom scale when comparing the 3-5 months before and the period of the COVID-19 stay-at-home orders. Furthermore, although measures of treatment engagement (i.e., PIH scores) fell modestly over this period, the change was not significant. Finally, as assessed by the Columbia Suicide Severity Rating Scale research version, there were no suicide attempts. None of the patients were hospitalized or seen in the emergency room during the stay-at-home orders.

TABLE I. Trajectory of Measures of Symptoms in a Group of Rural Patients With Serious Mental Illness in the Months Preceding and During the COVID-19 Stay-at-Home Orders ($n = 11$)

Measure	Instrument	Desired direction	Timing of measurement relative to the COVID-19 pandemic public health measures							
			4-6 m prior ^a		3-5 m prior		1-2 m prior		Stay-at-home orders	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD
Hopelessness	BHS	Lower	16.5	3.0	10.8	5.2	9.4	5.9	11.9	5.9
Suicidal ideation	BSS	Lower	19.9	4.6	11.3	6.6	9.5	9.3	11.0	6.4
Perceived burdensomeness	INQ-PB	Lower	29.2	9.8	18.7	7.7	15.7	8.9	17.5	8.1
Thwarted belongingness	INQ-TB	Lower	44.5	10.0	35.4	12.3	36.5	12.7	35.6	10.0
Treatment engagement	PIH	Higher	62.3	9.1	74.1	13.1	69.5	13.7	67.1	11.8

Abbreviations: BHS = Beck Hopelessness Scale; BSS = Beck Scale for Suicidal Ideation; INQ = Interpersonal Needs Questionnaire; m = months; PB = Perceived Burdensomeness; PIH = Partners in Health Scale; TB = Thwarted Belongingness.

^aMeasurement was taken during psychiatric hospitalization.

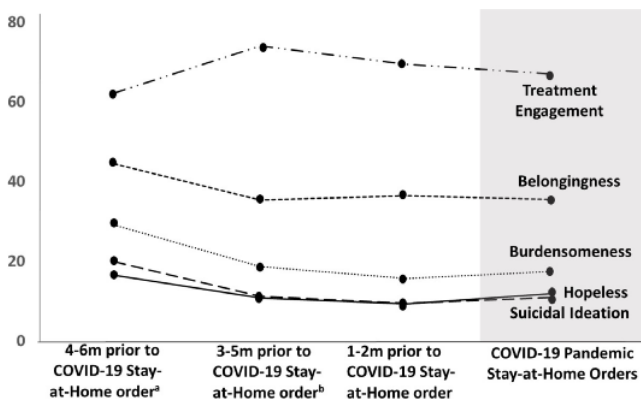


FIGURE 1. Self-reported symptoms and treatment engagement in a group of severely mentally ill rural patients in the months preceding and during the COVID-19 stay-at-home orders ($n = 11$).^c

Abbreviation: m = months.

^aPatients were psychiatrically hospitalized during this period of assessment.

^bPatients transitioned back to the outpatient setting in the period between 3 and 5 months before the COVID-19 stay-at-home order.

^cSymptoms of belongingness, burdensomeness, hopelessness, suicidal ideation, and treatment engagement were measured on standardized assessment scales.

Summary of Qualitative Findings

Eleven people were interviewed to assess the impact of the COVID-19 pandemic on treatment engagement and social connectedness. Many patients reported that the pandemic had a positive or neutral impact on their overall life and sense of connectedness (see Table S3). Notably, a number of patients perceived that their circle of acquaintances was already limited and that they were not interested in expanding it. If anything, the change in social norms was positive because it “normalized” their own baseline behaviors. Some patients, however, felt that the increased restrictions were problematic because the restrictions worsened their symptoms or compounded their pre-existing sense of isolation. This was particularly true for older adults. Yet, more than 50% of patients felt neutral about the term “social distancing” and believed that it was necessary during the current pandemic.

Older adults raised concerns about catching the virus, but no patients reported that they had been diagnosed with the virus. However, one patient reported a family member was infected with the virus. The majority of patients also denied that there were any disruptions to their mental health care during the pandemic. Although patients could identify several benefits to accessing mental health care through telepsychiatry, more than 50% of patients identified new challenges with this method of treatment delivery. For example, there were concerns about privacy, technological difficulties, lack of access to required equipment, and worries that the visit was less personal. A few patients stated that under ideal circumstances they would always choose face-to-face over a video or phone visit.

DISCUSSION

Among a population of rural patients with serious mental illness who had recently been psychiatrically hospitalized, we found that the current COVID-19 pandemic and related stay-at-home orders did not have a notable impact on symptoms of hopelessness, social connectedness, treatment engagement, or suicidal ideation. In fact, the significant improvements that these patients had attained in suicidal ideation and perceived burdensomeness post-hospital discharge were maintained even in the face of the recent pandemic. Subjectively, many patients also reported that they perceived that the pandemic either had a positive or neutral impact on their overall well-being and sense of connectedness. Few patients reported that there had been any disruptions to their mental health care. Our findings mirror those of Wang et al. (2020) who found in a longitudinal study of mental health outcome in a general population in China that there were no significant changes in mental health symptoms between January and March 2020.²³

Our observation that patients, in general, reported that their symptoms had not worsened (or in some cases, had improved) even in the face of the COVID-19 pandemic is noteworthy, especially given their high risk for symptom relapse. There may be a number of reasons for our findings. First, most

patients in our study reported that there were no notable disruptions to their mental health treatment despite the pandemic. Several patients had used telepsychiatry extensively before the pandemic and thus perceived no change in care. Perhaps, patients who have used telepsychiatry more extensively before the pandemic may also be more resilient during the crisis. This may be especially true for patients receiving care in rural VA facilities because the VA has promoted and used telepsychiatry for years.^{24,25} Second, a number of patients reported less stigma and greater sense of solidarity with society because everyone was being asked to avoid physical contact with others. It has been suggested that social solidarity during the time of a national or global crisis may be protective for members of society.^{26,27} Communities may also be quite resilient in the face of a social trauma.²⁸ Third, many patients reported they were able to maintain social supports and this was facilitated by the stay-at-home orders. For example, one patient had more contact with his family member because his family member now was not able to work. During the SARS epidemic in Hong Kong, Lau et al. (2006) also observed that a large proportion of respondents reported an improved sense of social support and attention to well-being during the epidemic as opposed to the period before the epidemic.²⁹ The authors attributed these observations, in part, to people having more time to spend together. Finally, because patients in our study generally lived in areas with low prevalence of COVID-19, they may not have perceived the same level of threat from the pandemic as those living in hot spots. Yet, among those reporting high distress, one patient noted that a family member was infected with the virus.

We did find that there were some patients who reported greater psychological distress over the current pandemic. It appeared that these patients were significantly older (71.7 years, SD: 4.0). Other authors have also raised concerns that older adults, in particular, may fair worse during this current pandemic. This may be due to a number of reasons including worries that public health strategies aimed at raising awareness of the health risks posed by COVID-19 to the most vulnerable populations such as the elderly may also have the unintended consequence of further marginalizing this population and promoting isolation.³⁰

It was noteworthy that although patients saw many benefits to the use of telepsychiatry especially during the pandemic, they pointed out a number of important challenges with telepsychiatry such as issues with access to the required equipment (on part of the patient and the provider) as well as worries about privacy and the ability to develop a therapeutic rapport with their providers. Although the literature suggests that treatment outcomes may be similar between telepsychiatry and face-to-face encounters,³¹ concerns have been raised about patient and provider satisfaction with the technology. Similar to our findings, a review by Hubley et al. (2016) found that although some studies report high satisfaction with telepsychiatry, other studies highlight that

patients are concerned about privacy, the ability to develop a patient–doctor relationship and technical problems.³²

A unique strength of our study is that we were able to look longitudinally at the course of mental health symptoms in rural patients with serious mental illness in 5 months leading up to the COVID-19 pandemic as well as during the stay-at-home orders. The symptoms that we measured are also highly relevant because suicidal ideation, social connectedness, and treatment engagement are critical factors that could be negatively impacted by the pandemic and its associated public health measures,⁴ especially in a rural population with serious mental illness.⁸

Our study also has important limitations. First, we included a small sample size and we were unable to reach all eligible participants. It is possible that the patients who were not included in our analysis were fairing worse. Second, our study population was largely comprised of patients who lived in Northern New England (Vermont and New Hampshire). These two states have not experienced as high a rate of infection in the population. Third, our population was limited to veterans who accessed care through the VA, a highly resourced integrated healthcare system. Therefore, patients may not encounter the same barriers to mental health treatment as may be experienced by the civilian population.^{24,25} Our population was quite unique in that the patients had been psychiatrically hospitalized in the past year and had serious mental illness. Other patients (with and without a history of mental illness) may have been differentially affected by the pandemic.³ For example, in a population-based study of individuals with pre-existing anxiety or mood disorders, Asmundson et al. (2020) found that symptoms worsened, especially among those with anxiety disorders during the early phase of the pandemic.³³ Finally, we did not follow these patients beyond the timeframe of the initial pandemic so we are unable to comment on whether the initial gains were sustained long term. Other studies of U.S. populations that have evaluated mental health symptoms beyond May 2020 have reported worsening mental health symptoms among the general population.¹³

CONCLUSIONS

Recently hospitalized patients with serious mental illness who access care in a rural setting may be fairly resilient in the face of the COVID-19 pandemic and its associated public health measures. These findings may be especially applicable to patients who remain engaged in treatment during the COVID-19-related restrictions. Promoting public health interventions to increase social support and ensuring access to mental health care during a pandemic is critical, and patients are generally willing to use these treatment modalities. Moreover, rural patients with serious mental illness may benefit from public health efforts that aim to promote solidarity and reduce stigma. It will be important for researchers to track longer term outcomes in rural patients with serious mental

illness in order to better understand the impact of the COVID-19 pandemic on this population over time and to determine any unique treatment needs.

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SUPPLEMENTARY MATERIAL

Supplementary material is available at *Military Medicine* online.

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CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest.

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