PTSD Symptom Severity and Overall Quality of Life Pre- and During COVID-19 Among Adults Seeking Housing Support Services

Annette S. Crisanti 1 | Mohammed Quazi 1 | Tyler Kincaid 1 | Anastacia De W Romero 1 | Xiaoya Wu 1 | Neal Bowen 2 | and Deborah Altschul 1

1 Department of Psychiatry and Behavioral Sciences, Health Sciences Center, University of New Mexico
2 Behavioral Health Services Division, New Mexico Human Services Department, Santa Fe, New Mexico

Corresponding Author: Annette, S. Crisanti
Email: acrisanti@salud.unm.edu

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Abstract
Coronavirus disease of 2019 (COVID-19) stay-at-home orders have had far-reaching negative consequences on mental health and quality of life (QOL). This is especially true for vulnerable populations, such as those who are unhoused, as they are more likely than the general population to have been struggling with a mental illness and poor QOL well before the pandemic. This exploratory cross-sectional study explored differences in Post-Traumatic Stress Disorder (PTSD) symptom severity and overall QOL among a cohort of adults who were seeking housing support services pre-COVID-19 (n = 226) compared to a cohort of adults who were seeking housing support services during COVID-19 (n = 205). All data were collected upon enrollment into a permanent supportive housing program. Participants seeking housing support services during COVID-19 compared to pre-COVID-19 were significantly more likely to report higher PTSD symptoms (t=3.14, p=0.001) and poorer QOL ($\chi^2=9.81$, p=0.001); however, differences were no longer observed at the five percent significance level once several covariates were controlled for in the analysis. Despite the lack of statistical significance at the multivariate level (which is probably due to issues with the missing data and the statistical significance level chosen, rather than a reflection of actual differences between the cohorts), the clinical significance of the findings has implications for planning behavioral health services for unhoused individuals seeking housing support services, especially as we exit the pandemic.

Keywords
COVID-19; unhoused; PTSD; Quality of Life

Introduction

Although enacted to protect the public by reducing the spread of COVID-19, evidence is accumulating that stay-at-home orders have had far-reaching negative consequences on mental health and quality of life (QOL) among various populations (Aragona et al., 2020; Dhaheri et al., 2021; Panchal et al., 2021; Pedrosa et al., 2020; Riley et al., 2021; Scarlett et al., 2021; Stack et al., 2021; Tsamakis et al., 2021; Tucker et al., 2020). This is especially true for unhoused adults (Perri et al., 2020; Wynn & Stergiopoulos, 2021) who have struggled with high rates of mental illness and poor QOL even well before the pandemic (Ayano et al., 2020, 2021; Crisanti et al., 2017; Gentil et al., 2019; Hubley et al., 2014). Of all the mental illnesses, post-traumatic stress disorder (PTSD) is disproportionally higher among unhoused adults compared to their counterparts in the general population (Duke & Searby, 2019; Kessler et al., 2012; Tsai et al., 2020). A recent
systematic review and meta-analysis on the prevalence of PTSD among adults who were unhoused reported a pooled prevalence of 27.38% compared to the lifetime prevalence of 10.1% among adults in the United States (U.S.) (Ayano et al., 2020). With respect to QOL, a systematic review of QOL among individuals who were unhoused found consistently lower reports of QOL compared to the general population across various measures, including the 36 and 12 items versions of the Short Form Surveys (which measure quality of life and health status of particular populations) and more comprehensive instruments (Hubley et al., 2014).

While the literature on the consequences of stay-at-home orders on mental health and QOL is growing, only two studies focused on adults who were unhoused, and among those studies, data collection was limited to a point in time (i.e., restricting analysis to data collected during COVID only) (Riley et al., 2021; Scarlett et al., 2021). Riley et al. (2021) found that among 128 unhoused women between July and December 2020 in San Francisco, California, 55% met the criteria for depression (as measured by the Patient Health Questionnaire-9, PHQ-9) and 42% met the criteria for anxiety (as measured by the Generalized Anxiety Disorder Assessment-7). Social isolation was significantly associated with depression (OR = 3.29) and anxiety (OR = 5.22). Furthermore, among women who reported difficulties getting care for a chronic medical condition during the pandemic compared to women who did not have difficulties, PHQ-9 scores were 3.92 points higher, and Generalized Anxiety Disorder Assessment-7 scores were 3.28 points higher. Compared to their counterparts, the odds of screening positive for depression and anxiety among women who reported difficulties getting care for a chronic medical condition during the pandemic was 6-times and 3-times higher, respectively. Scarlett et al. (2021) collected data from 527 participants living in temporary and/or emergency shelters in France following the first lockdown (02/05/2020 – 07/06/2020). 30% of participants screened positive for depression on the PHQ-9, and higher rates were observed among participants who were female, single, chronically ill, facing food insecurity, and in various regions in France.

The primary objective of this study was to explore whether there were differences in ratings of PTSD symptom severity and ratings of overall QOL among a cohort of unhoused adults who were seeking housing support services pre-COVID-19 compared to a cohort of unhoused adults who were seeking housing support services during COVID-19 while controlling for several covariates. We were in a unique position to compare these two cohorts with respect to PTSD symptoms and overall QOL because of a long-standing evaluation of housing support services conducted by the authors. We hypothesized that PTSD symptom severity would be higher and overall QOL would be poorer among the COVID-19 cohort compared to the pre-COVID-19 cohort.

Methods

Study Design

This exploratory cross-sectional study drew data from two independent cohorts that were recruited into a program evaluation while seeking housing support services at two community-based agencies in New Mexico (NM). Both agencies specialize in providing housing and housing support services in Santa Fe and Bernalillo Counties, NM, to adults living on the streets, in shelters, in their cars, and other places not fit for human habitation. The majority of New Mexicans reside in these two counties, with populations ranging from 87,505 (Santa Fe County) to 676,444 (Bernalillo County) (U.S. Census Bureau, 2020). The governor of NM issued the NM COVID-19 public health emergency order in March 2020, which closed all businesses and non-profit entities (except for those deemed essential) (New Mexico Department of Public Health (NMDOH), 2020). This impacted the delivery of care provided by the housing support agencies from which participants were recruited. Caseloads were reduced by half; shelter loads were reduced drastically; the majority of services were only provided via telehealth, lines for in-person services were reduced to 5-10 individuals at most, and all psychosocial groups were discontinued. The pre-COVID-19 cohort was recruited between February 2016 and September 2018. Recruitment for the during COVID-19 cohort started in August 2020, four months following the enactment of the NM COVID-19
public health emergency order, through to December 2022.

Population Studied

The target population for both cohorts included adults (18 years of age or older) who were seeking housing support services because of being chronically homeless and had a mental illness or co-occurring mental illness and substance use disorder (SUD). Eligible individuals were identified through a Coordinated Assessment with a focus on selecting individuals with the greatest need due to length of housing instability and behavioral health symptom severity (Gardner et al., 2010). Diagnoses were determined by a master-level independently licensed counselor through a structured face-to-face clinical interview when participants entered services and were based on the Diagnostic and Statistical Manual of Mental Disorders 5th Edition (Diagnostic and Statistical Manual of Mental Disorders, 2013). Chronic homelessness was defined as a period of homelessness lasting at least a year, or occurring repeatedly, while struggling with a disabling condition, which included a mental illness or co-occurring mental illness and SUD (US Department of Housing and Urban Development, 2015).

Procedure

Individuals were asked to participate in a program evaluation upon enrollment into a Permanent Supportive Housing (PSH) program at either of the agencies (Rog et al., 2014). The consent process and data collection were completed through structured interviews by trained research assistants. Data were collected within seven days of enrollment into PSH and after the completion of consent to participate in the evaluation. Participants received a $20.00 gift card after completion of the interview. Institutional Review Board (IRB) approval was obtained from the University’s Human Research Protections Office (IRB, ID#15-619 and ID# 20-361). All data were collected via self-report.

Response Variables

PTSD symptom severity was measured by the PTSD Checklist - Civilian Version (PCL-C) (Weathers et al., 1993). The PCL-C is a 17-item self-report scale which measures core PTSD symptoms in the past month from 1 (“Not at all”) to 5 (“Extremely”). Responses to 17 items were summed to yield a total severity score ranging from 17 to 85, with higher scores indicative of higher symptom severity. The PCL-C has good internal consistency, test-retest reliability, and convergent validity (Wilkins et al., 2011).

QOL was measured from the Overall QOL question from the World Health Organization (WHO) Quality of Life Instrument - Brief Version (WHOQOL-BREF) (Development of the WHOQOL-BREF Quality of Life Assessment, 1998; WHO, 2012). The question asked: “In the last 30 days, how would you rate your quality of life?” Participants rated their response on a 5-point Likert scale, ranging from Very Poor, Poor, Neither Poor nor Good, Good, or Very Good. Responses were dichotomized into “Poor” and “Good” quality of life, with the first three of the responses on the Likert scale being recorded as “Poor” and the last two responses on the Likert scale being recoded as “Good”. This one question from WHOQOL-BREF is a reliable measure of overall quality of life, validated with adults experiencing homelessness (Garcia-Rea & LePage, 2010; Gordon et al., 2019).

Covariates

The primary covariate was cohort: pre-COVID-19 and during COVID-19. Several additional covariates were controlled for in the analysis based on their demonstrated relationships to PTSD symptom severity and QOL, the potential for confounding, and for which data were available (Flanagan et al., 2016; Hailes et al., 2019; McCauley et al., 2012; Senneseth et al., 2012; Stevens et al., 2020). Alcohol use in the past 30 days and responses were dichotomized into a yes/no variable. Opioid use in the past 30 days and responses were dichotomized into a yes/no variable. Period prevalence of violence was based on responses to the question, “In the past 30 days, how often have you been hit, kicked, slapped, or otherwise physically hurt”? Responses were dichotomized into a yes/no variable. Lifetime prevalence violence/trauma was based on responses to the
question, “Have you ever experienced violence or trauma in any setting (including community or school violence, domestic violence, physical, psychological, or sexual maltreatment/assault within or outside the family, natural disaster, terrorism, neglect, or traumatic grief)?” Responses were dichotomized into a yes/no variable. Ethnicity was coded as Hispanic or non-Hispanic. Race was coded into three categories: (i) White, which included individuals who identified themselves solely as White; (ii) Minority, which included individuals who identified themselves not as White and belonging to at least one of the five minority races (American Indian, Asian, Black, Alaska Native, and Native Hawaiian); and (iii) Multiracial, which included individuals who reported they were White as well as at least one of the five other minority races. County included Santa Fe or Bernalillo. Age was grouped into four categories: 18-34, 35-54, and 55-74, and >=75. Gender included male, female, and other (e.g., transgender male, transgender female). Education included three categories: less than high school, high school diploma/equivalent, or some post-secondary education. Employment status included employed full time, employed part time, unemployed/disabled, unemployed looking for work, and other (e.g., retired). Diagnoses were grouped into two broad categories, including mental illness and co-occurring mental illness and SUD. The majority of the covariates were based on self-report data collected upon admission to PSH, except for the primary diagnosis that was determined by clinical staff based on diagnostic interviews also upon admission to PSH. All the covariates, along with their categories and counts, are shown by cohort in Table 1. As per the Research Data Assistant Center (https://resdac.org/articles/cms-cell-size-suppression-policy), categories with cell counts less than 10 are not reported in Table 1, which included >=75 for age group and the other category for the gender variable.

Statistical Analysis

Initial analyses were conducted to explore differences between cohorts (pre-COVID-19 and during COVID-19) at the bivariate level among all the variables included in the analysis. Parametric Chi Squared tests for independence were used for categorical variables, and a parametric two-sample t test was used for the one continuous variable (PCL-C). Two separate additive models were used to study whether PTSD symptom severity and QOL differed among cohorts (pre and during COVID-19) while controlling for multiple covariates. A multiple linear regression model was used to study PTSD symptom severity for 431 participants. A logistic regression model was used to study the binary classes of quality of life for 304 participants (127 records were missing data on QOL and were, therefore removed from the model). No significant differences were observed when participants who remained in the logistic regression model were compared to those who were excluded on several variables, including PTSD symptom severity ethnicity, alcohol use, opioid use, and period prevalence violence (reducing concerns related to selection bias). The models are statistically robust, and no serious multicollinearity was found among the covariates in either of the models. Variance inflation factors were around 1 for all the covariates in both the models. Statistical significance was operationalized at the five percent experimental error level (α=0.05). Python programming language was used for data curation and preliminary data analysis, and R programming language for statistical modeling.

Results

The pre-COVID-19 and during-COVID-19 cohorts included 226 and 205 participants, respectively. A significant difference was observed between the pre-COVID-19 cohort and during COVID-19 cohort in the following variables: ethnicity ($\chi^2$=9.34, p=0.002), gender ($\chi^2$=17.08, p=<0.001), age group ($\chi^2$=13.63, p=0.003), employment status ($\chi^2$=13.74, p<0.003), and diagnosis ($\chi^2$=22.69, p=0.001) (see Table 1). The during COVID-19 cohort was significantly more likely than the pre-COVID-19 cohort to be diagnosed with a co-occurring mental illness/SUD. They were also significantly more likely to be Hispanic, younger, female, and employed in the past 30 days. PTSD symptom severity was significantly higher during the COVID-19 cohort ($t$=3.14, p=0.001) compared to the pre-COVID-19 cohort. Individuals in COVID-
19 cohort were significantly more likely to rate their QOL as poor compared to those in the pre-
COVID-19 cohort ($\chi^2=9.81$, $p=0.001$) (see Table 2).

Table 1
Frequency of Covariates Among Pre-COVID-19 and During COVID-19 Cohorts.

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Pre-COVID-19</th>
<th>During COVID-19</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>County</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Santa Fe</td>
<td>120 (53.1%)</td>
<td>100 (48.8%)</td>
<td>0.370</td>
</tr>
<tr>
<td>Bernalillo</td>
<td>106 (46.9%)</td>
<td>105 (51.2%)</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>127 (56.4%)</td>
<td>85 (41.7%)</td>
<td>0.002</td>
</tr>
<tr>
<td>Hispanic</td>
<td>98 (43.6%)</td>
<td>119 (58.3%)</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>111 (58.1%)</td>
<td>105 (62.1%)</td>
<td>0.388</td>
</tr>
<tr>
<td>Minority</td>
<td>56 (29.3%)</td>
<td>39 (23.1%)</td>
<td></td>
</tr>
<tr>
<td>Multiracial (White/Minority)</td>
<td>24 (12.6%)</td>
<td>25 (14.8%)</td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Male</td>
<td>141 (62.4%)</td>
<td>90 (43.9%)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>84 (37.2%)</td>
<td>109 (53.2%)</td>
<td></td>
</tr>
<tr>
<td><strong>Age Group</strong></td>
<td></td>
<td></td>
<td>0.003</td>
</tr>
<tr>
<td>16-34</td>
<td>47 (20.8%)</td>
<td>74 (36.1%)</td>
<td></td>
</tr>
<tr>
<td>35-54</td>
<td>124 (54.9%)</td>
<td>83 (40.5%)</td>
<td></td>
</tr>
<tr>
<td>55-74</td>
<td>54 (23.9%)</td>
<td>47 (23.0%)</td>
<td></td>
</tr>
<tr>
<td><strong>Employment Status</strong></td>
<td></td>
<td></td>
<td>0.003</td>
</tr>
<tr>
<td>Employed</td>
<td>18 (8.0%)</td>
<td>35 (17.2%)</td>
<td></td>
</tr>
<tr>
<td>Unemployed/Disabled</td>
<td>56 (24.8%)</td>
<td>62 (30.4%)</td>
<td></td>
</tr>
<tr>
<td>Unemployed Looking for Work</td>
<td>63 (27.9%)</td>
<td>52 (25.5%)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>89 (39.3%)</td>
<td>55 (27.0%)</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td>0.206</td>
</tr>
<tr>
<td>Less than High School</td>
<td>61 (27.1%)</td>
<td>66 (32.2%)</td>
<td></td>
</tr>
<tr>
<td>High School Diploma/Equivalent</td>
<td>71 (31.6%)</td>
<td>71 (34.6%)</td>
<td></td>
</tr>
<tr>
<td>Post-secondary Education</td>
<td>93 (41.3%)</td>
<td>68 (33.2%)</td>
<td></td>
</tr>
<tr>
<td><strong>Diagnosis</strong></td>
<td></td>
<td></td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mental Illness (MI) Only</td>
<td>93 (41.2%)</td>
<td>66 (32.2%)</td>
<td></td>
</tr>
<tr>
<td>Co-occurring MI/SUD</td>
<td>116 (51.3%)</td>
<td>139 (67.8%)</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>17 (7.5%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
<tr>
<td><strong>Alcohol Use</strong></td>
<td></td>
<td></td>
<td>0.825</td>
</tr>
<tr>
<td>No</td>
<td>138 (61.3%)</td>
<td>123 (60.9%)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>87 (38.7%)</td>
<td>81 (39.8%)</td>
<td></td>
</tr>
<tr>
<td><strong>Opiate Use</strong></td>
<td></td>
<td></td>
<td>0.752</td>
</tr>
<tr>
<td>No</td>
<td>207 (91.6%)</td>
<td>186 (90.7%)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>19 (8.4%)</td>
<td>19 (9.3%)</td>
<td></td>
</tr>
<tr>
<td><strong>Period Prevalence Violence</strong></td>
<td></td>
<td></td>
<td>0.848</td>
</tr>
<tr>
<td>No</td>
<td>184 (83.0%)</td>
<td>166 (82.2%)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>38 (17.0%)</td>
<td>36 (17.8%)</td>
<td></td>
</tr>
<tr>
<td><strong>Lifetime Prevalence Violence</strong></td>
<td></td>
<td></td>
<td>0.652</td>
</tr>
<tr>
<td>Violence/Trauma</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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PTSD Symptom Severity

The multiple linear regression model found no statistically significant differences (α=0.05) between the pre-COVID-19 and during-COVID-19 cohorts on PCL-C scores once controlling for multiple covariates. The model did include significant covariates. Specifically, females, individuals who used opioids in the past 30 days, individuals who experienced violence in the past 30 days, and that have a lifetime of past violence and trauma have significantly higher PCL-C scores than males, those who did not experience violence in the past 30 days, and those that did not report a lifetime prevalence of violence/trauma. Furthermore, individuals in the age group 35-54 had significantly lower PCL-C scores than those in other age groups. The multiple linear regression results are presented in Table 3. Only the estimates associated with statistically significant covariates have been included.

Table 3
Multiple Linear Regression Model Results: PCL-C Score Estimates.

<table>
<thead>
<tr>
<th>Covariate</th>
<th>PCL-C score estimates*</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-COVID-19 Cohort</td>
<td>43.51</td>
<td>0.152</td>
</tr>
<tr>
<td>Age Group 35-54</td>
<td>40.79</td>
<td>0.009</td>
</tr>
<tr>
<td>Gender: Male</td>
<td>41.44</td>
<td>0.007</td>
</tr>
<tr>
<td>Opioid Use</td>
<td>52.90</td>
<td>0.014</td>
</tr>
<tr>
<td>Period Prevalence Violence</td>
<td>50.54</td>
<td>0.030</td>
</tr>
<tr>
<td>Lifetime Prevalence of Violence/Trauma</td>
<td>57.88</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*The estimates reported are adjusted for all covariates, including those that were not significant at α=0.05: Alcohol Use, Education, Employment, Race, Ethnicity, Diagnosis, and County. The base expected PCL-C score at the intercept is 45.95, which is also the expected PCL-C score for the following reference groups: During the COVID-19 cohort, Age Group: 16-34, Gender: Female, Opioid Use: No, Period Prevalence Violence: No, and Lifetime Prevalence Violence/Trauma: No.

Quality of Life

The odds of reporting good QOL was 1.78 times higher for the pre-COVID-19 cohort.
compared to the during-COVID-19 cohort. However, the logistic regression model found no statistically significant differences between the pre-COVID-19 and during-COVID-19 cohort on reports of QOL once controlling for multiple covariates. The model did include significant covariates. Specifically, individuals in the 55-75 age group and those who have reported a lifetime prevalence of past violence and trauma have significantly lower odds of reporting good QOL. The multiple linear regression results are presented in Table 4. Only the estimates associated with statistically significant covariates have been included.

Table 4
Logistic Regression Model Results: Adjusted Odds Ratios for Good QOL.

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Adjusted Odds Ratio*</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-COVID-19 Cohort</td>
<td>1.78</td>
<td>(0.93 – 3.38)</td>
<td>0.078</td>
</tr>
<tr>
<td>Age Group 55-74</td>
<td>0.32</td>
<td>(0.13 – 0.71)</td>
<td>0.006</td>
</tr>
<tr>
<td>Lifetime Prevalence of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violence/Trauma</td>
<td>0.34</td>
<td>(0.12 – 0.86)</td>
<td>0.026</td>
</tr>
</tbody>
</table>

*The estimates reported are adjusted for all covariates, including those that were not significant at α=0.05: Alcohol Use, Opioid Use, Period Prevalence, Violence, Ethnicity, Race, Gender, Education, Employment, Diagnosis, and County. Reference groups for the ORs are: During the COVID-19 cohort, Age Group: 16-34, and Lifetime Prevalence Violence/Trauma: No.

Discussion

The impetus for this study came from conversations with housing service providers in NM who were concerned with the change in symptom acuity among adults who were seeking housing support services during COVID-19 compared to those seeking services pre-COVID-19. Given our longstanding history of conducting mental health services research and evaluation using the same study protocol with the same agencies providing PSH in NM, we were in a unique position to explore whether their clinical impressions were accurate. Noteworthy is that changes in the mental health and well-being of participants pre- and during COVID-19 have been reported by homeless service providers elsewhere (Rodriguez et al., 2021). Through semi-structured interviews, representatives (N = 18) from community-based organizations in Tippecanoe County, Indiana, indicated that during COVID-19, their participants were substantially more stressed and that the isolation and limited access to services has had a negative impact on mental health and substance use (Rodriguez et al., 2021).

To a certain extent, our comparison of PTSD symptom severity and overall QOL among adults seeking housing support services pre-COVID-19 compared to during COVID-19 confirmed the perceptions among housing service providers in NM, and what was reported by Rodriguez et al. (2021). Perceptions of overall QOL were significantly poorer, and PTSD symptom severity was significantly higher among unhoused adults who were seeking housing support services during COVID-19 compared to their counterparts pre-COVID-19. While statistical significance was no longer observed once several covariates were controlled for in the multivariate regression models, this artifact was likely more a result of shortfalls related to the data (e.g., extensive missingness, controlling for multiple covariates, lack of power, and setting an at 0.05). Given the substantial differences in the percent of individuals reporting poor QOL and the higher mean PCL-C scores among participants in the during COVID-19 cohort compared to pre-COVID-19 cohort, we have enough reasons to believe that important differences in these PTSD symptom severity and perceptions of overall QOL do in fact exist. Noteworthy, is that several significant demographic and clinical differences were observed when comparing the pre-COVID-19 cohort to the during-COVID-19 cohort that warrant further research given the implications with respect to housing support services policies and practices. Compared to the pre-COVID-19 cohort, the during COVID-19 cohort had a significantly higher number of females, young
adults (ages 18-34), and individuals who were employed. With respect to employment as a covariate, it was not statistically significant in predicting PTSD symptom severity or QOL. This shift could be a result of several reasons, including missing data and the distribution of the employment variable. Future research should examine the role that employment plays in the lives of individuals who were unhoused during COVID-19 with respect to PTSD symptom severity, QOL, and other relevant outcomes (e.g., physical health).

These findings are not surprising, given the far-reaching negative consequences of COVID-19 and the stay-at-home orders on unhoused adults (Perri et al., 2020). Because of the shared-living and crowded conditions in which they live (including shelters and other public places), their high prevalence of chronic health conditions, and premature mortality from numerous causes (Brown et al., 2012; Funk et al., 2022; Snyder & Eisner, 2004), unhoused adults were at increased risk of COVID-19 exposure and infection, and once infected, increased risk of COVID-19 morbidity and mortality (Baggett et al., 2020; Culhane et al., 2020; Imbert et al., 2021; Leifheit et al., 2021; Maxmen, 2020; Perri et al., 2020). A cross-sectional survey administered among 6,607 low and middle-income adults in the U.S. found that a history of homelessness was significantly associated with testing positive for COVID-19 (Tsai et al., 2021). More recently, using data from the Premier Healthcare Database (which includes more than 800 hospitals in the US), Montgomery et al. (2022) evaluated the outcome of 9,434 people experiencing homelessness who were evaluated in the emergency department or were hospitalized for COVID-19 from April 1st, 2020, to June 30, 2021. People experiencing homelessness evaluated in the emergency department for COVID-19 were significantly more often hospitalized than the general population, 64.5% compared to 49.7% (P < .001). Once hospitalized, people experiencing homelessness had a significantly longer mean length of stay (11 days, SD = 26) and a higher frequency of readmission (8.5%) compared to the general population: mean length of stay was 8 days (SD = 10) and readmission 4.6%. A review of COVID-19 case fatality rates among unhoused individuals across major U.S. health jurisdictions found that fatality was 1.3 times (95% CI 1.1-1.5) that of the general population (Leifheit et al., 2021). Stay-at-home orders and related restrictions on social distancing (i.e., the need to stay at least 6 feet apart) have a much greater impact on people who don’t have a home and who rely on shelters or public spaces (including malls, libraries, and train stations) for safety, hygiene, and basic needs (Perri et al., 2020; Wynn & Stergiopoulos, 2021). In a recent study of youth experiencing homelessness (N = 90 ages 18-25), most participants indicated that it was hard during COVID-19 to meet one or more of their basic needs, including having enough food to eat (54%), being able to access case management (42%), mental health services (44%), and substance use services (32%). In addition, 48% reported because of COVID-19, it was harder to find or keep a job (Tucker et al., 2020). Other COVID-19-related challenges experienced by people who are unhoused include poor access to hand washing and face masks; among those who test positive for COVID-19, there was little access to safe places to recover and isolate (Henwood et al., 2020; Perri et al., 2020; Rodriguez et al., 2021).

With respect to ethnicity, 58% of the during COVID-19 cohort, compared to 44% of the pre-COVID-19 cohort, were Hispanic (p = 0.002). The pre-COVID-19 cohort was more representative of the population of NM, which is 49% Hispanic (U.S. Census Bureau, 2020). The over-representation of Hispanics seeking housing support services in the during COVID-19 cohort may be linked to the various COVID-19-related disparities that have been observed during the pandemic. Nationally, the CDC reported higher rates of COVID-19-related challenges, hospitalization and death for Hispanic/Latino populations in the US compared with non-Hispanic White populations, even when accounting for socioeconomic factors (Centers for Disease Control and Prevention, 2021). Additionally, research has indicated that COVID-19 has taken a personal and financial toll on Hispanics/Latinos more so than non-Hispanics (Noe-Bustamante et al., 2021). A study in Denver found that adults with COVID-19 who identified as Hispanic were more likely than non-Hispanic individuals to be members of large households, have known exposure to people with COVID-19, work in essential jobs (i.e., agriculture, construction, health care, food services), and continue to work while ill because of economic
Importantly, although strong social networks are often viewed as protective factors in Hispanic populations, these networks may present elevated risk for exposure to infectious diseases. Thus, socio-cultural factors that increased risk for COVID-19 may have resulted in increased need for support services, including housing and behavioral health services.

This exploratory study was limited by the cross-sectional nature of the data, which prohibits conclusions regarding causation. Also, the cohorts (pre- and during) included individuals seeking housing support services at the same agencies. While very unlikely, an individual may be represented in both cohorts. Unfortunately, because data were deidentified, there was no way to determine the extent of duplication or whether it even existed. In addition, all data were self-reported, which is subject to information bias (Althubaiti, 2016), and the covariates were limited to those variables for which data existed for both cohorts. The number of days (rather than a yes/no dichotomous variable) in which opioids or alcohol were used in the past 30 days, and/or the extent of lifetime or period prevalence victimization/trauma would have been much more informational, but these details were not collected. Finally, data were missing on various covariates, and 127 participants were missing data on the QOL response variable. As a result, only 304 participants were included in the logistic regression model. Missing data is just one of the challenges associated with conducting research on homeless populations (Ojo-Fati et al., 2017). While participants who were excluded from the analysis did not differ significantly from those who were included on PTSD symptom severity and a number of covariates, the potential for selection bias to impact the conclusions has not been eliminated completely as there may be differences between the two groups (e.g., length of time being unhoused) that we were unable to explore with the current dataset. Despite these shortcomings, this study contributes to the limited body of literature by providing insight into the impact of COVID-19 on unhoused adults seeking housing support services in the U.S. with respect to PTSD symptom severity and perceptions of overall QOL.

Implications for Health Care Systems

In January 2020, there were 580,466 unhoused individuals in the United States (U.S.) (National Alliance to End Homelessness, 2021). NM had an estimated 3,333 unhoused individuals (US Interagency Council on Homelessness, 2020). More recent data from the 2021 Point in Time (PIT) Count of unsheltered homelessness in NM, found that 1,152 households were experiencing homelessness in Albuquerque, of which 21.9% indicated that they were unhoused due to COVID-19, and 905 were experiencing homelessness in the rest of the state with 12.6% indicating COVID-19 as a reason (New Mexico Coalition to End Homelessness, 2021). Although PIT Counts are crucial, they are an undercount of the actual total – some experts say by half or more – and not without limitations (Boone, 2019; Brown, 2021; Schneider et al., 2016). Additionally, COVID-19-related disruptions to PIT Counts nationwide led to issues in data collection on sheltered and unsheltered homelessness (US Department of Housing and Urban Development, 2022). Those who sought housing support services during-COVID-19 were significantly more likely than those seeking assistance for housing pre-COVID-19 to be Hispanic, female, younger, employed, and experiencing a co-occurring mental illness/SUD. Despite the lack of statistical significance at the multivariate level (which is probably due to issues with the missing data and the statistical significance level chosen, rather than a reflection of actual differences between the cohorts), the clinical significance of higher rates of PTSD symptom severity and poorer QOL among our current unhoused adults have implications for planning behavioral health services for unhoused individuals seeking housing support services post-pandemic. For example, housing support service agencies may want to consider adding trauma-specific treatment to their spectrum of services (if they don’t already have this treatment option), knowing that rates of PTSD symptom severity among individuals seeking services may have increased as a result of the pandemic. Seeking Safety (Najavits, 2002) is just one example of a trauma-specific treatment that has had much success in reducing PTSD symptoms among unhoused populations (Desai et al., 2008; Gorzynski, 2019). The demographic differences

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that were observed between the pre- and during COVID-19 cohorts are important findings as they reinforce the need for age and culturally appropriate housing support services as well as for ancillary services such as supportive employment. While the WHO declared the end to COVID-19 as a global public health emergency in May 2023 (WHO Director-General’s Opening Remarks at the Media Briefing, 2023), the full eradication of COVID-19 is far from over, especially because of new variants of concern (Zhang et al., 2023). With this in mind, these findings also emphasize the importance for housing support services to better prepare for the next pandemic to support, as best possible, the mental health of unhoused individuals (Morganstein, 2022).

**Declarations**

**Ethics Approval:** The studies were approved by the local University’s Human Research Protections Office, and Institutional Review Board (IRB, ID#15-619 for the HHRHI study and ID# 20-361 for the OD study). We have no conflicts of interest to disclose.

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**Competing Interests:** We confirm that this work is original and has not been published elsewhere, nor is it currently under consideration for publication elsewhere. We have no conflicts of interest to disclose.

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