Invisible Spread and Perceived Stress Amidst COVID-19

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ABSTRACT

Introduction. There are limited reports on the mental health toll associated with the fear of spreading coronavirus disease 2019 (COVID-19) and the associated stay-at-home orders. The goal of the present study was to characterize the self-reported stress of participants from the Kansas City Metropolitan Area (KCMA) and to examine the relation between potential for asymptomatic spread and perceived stress.

Methods. This prospective convenience sample study enrolled 461 participants from May 4 to May 22, 2020. Participants were consented and surveyed prior to free SARS-CoV-2 testing. Measures employed included the Perceived Stress Scale-10 and a comprehensive COVID-19 questionnaire. During the study period, testing resources were limited. In the community, only symptomatic individuals or close contacts of known positives could be tested. Our program aimed to reach those who were unable to access testing resources due to their asymptomatic status or other barriers to care.

Results. Worry about asymptomatic spread was associated significantly with greater perceived stress ($p < 0.001$). Higher stress was reported among women ($p < 0.001$), Hispanic/Latinx ($p = 0.001$), non-Black/African American individuals ($p < 0.001$), and those reporting the presence of COVID-19 symptoms ($p = 0.001$).

Conclusions. The COVID-19 pandemic has caused significant economic, social, and health disruptions around the world. Distress is significantly related to concern over unintentionally contributing to the spread of SARS-CoV-2 through asymptomatic transmission. In addition to examining outcomes like distress, future research should characterize the modifiable psychotherapeutic processes that might be targeted through intervention among those experiencing distress.
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INTRODUCTION

Kansas and Missouri leaders issued statewide stay-at-home orders on March 30 and April 4, 2020, respectively, to mitigate the spread of COVID-19. Stay-at-home orders resulted in significant growth in unemployment claims across the country and have been associated with loneliness and social isolation.[1,2] Reopening hinged on case detection and isolation, but the limited availability of testing resources created the need for monitoring a series of predictive symptoms.

Asymptomatic infections brought about the potential for unknowingly spreading the virus, even with careful symptom monitoring, and represent a potential source of anxiety and fear. There are limited reports on the mental health toll associated with the fear of spreading COVID-19 and the associated stay-at-home orders.[3,4] The goal of the present study was to characterize the self-reported stress of participants from the Kansas City Metropolitan Area (KCMA) and to examine the relation between potential for asymptomatic spread and perceived stress. It was hypothesized that individuals who were concerned about asymptomatic spread would report elevated perceived stress.

METHODS

Procedures. Enrollment began for this prospective convenience sample study on May 4, 2020, and all data collection ended before both Kansas and Missouri re-opened following governmental stay-at-home orders (May 22, 2020). The Institutional Review Board approved this study. Data collection and consent were completed via Research Electronic Database Capture (REDCap®), a secure, web-based software platform designed for research.[5] Participants received a link either via email, social media, or QR codes on promotional flyers to a consent and survey, or were given tablet devices to complete consents prior to testing. Demographic data are required by health departments for reporting, and 461 people electronically consented to provide this information and were tested.

Participants. Non-profit community-based organizations recruited adults from the communities they serve through outreach flyers, social media, and local media coverage. Eligible participants included anyone interested in free testing for SARS-CoV-2; all associated costs were grant funded. Symptom status (symptomatic, pre-symptomatic, or asymptomatic) was not part of the selection criteria, and the sample ultimately included both those with symptoms and those without. At the time of data collection, SARS-CoV-2 testing in the KCMA was limited to symptomatic individuals or close contacts of known positives, so this program was unique in that it welcomed asymptomatic individuals. As Table 1 shows, the average age of participants was 44.94 (SD = 14.56); the majority, 70% (321 of 461), were women; and 67% (310 of 461) identified as White.

Measures. The Perceived Stress Scale-10 (PSS-10) is a reliable and valid 10-item, 5-point Likert-type scale format instrument (0 = never to 4 = very often), and the total score ranges from 0 to 40.6. Higher scores indicated greater perceived stress.[7] Internal consistency in this sample was adequate (alpha = 0.88). Item-level missing data were imputed if 80% or more of the items were complete (n = 11).

Participants completed a comprehensive questionnaire, including self-reported demographics. As concerns about the impact of the pandemic grew, researchers and government agencies created publicly available survey question banks. Specifically, the National Institutes of Health Office of Behavioral and Social Sciences Research compiled lists of questions with the hopes of creating more consistent data collection across clinical and population research programs (https://www.niehs.nih.gov/research/programs/disaster/index.cfm). The questions used in our study were selected from these resources. Specific questions regarding amount of information ("How much information do you feel you have about COVID-19?") and worry about

asymptomatic spread ("During the past two weeks, how worried have you been about friends or family being infected because you accidently brought it home?") were included (see Appendix A). Comparisons were conducted using independent samples t-tests or analyses of variance, and continuous associations were examined using bivariate correlations.

Table 1. Sample demographics and characteristics (N = 461).

	N	%*
State of residence		
Kansas	218	47.3
Missouri	243	52.7
Age, M (SD)	44.94	14.56
Gender		
Women	321	69.6
Men	137	29.7
Other	3	0.7
Racial background**		
White	310	67.2
African American or Black	98	21.3
Asian	7	1.5
Native American/Alaska Native	9	2.0
Native Hawaiian/Pacific Islander	1	0.2
Other	57	12.4
Ethnicity		
Hispanic/Latinx	92	20
Non-Hispanic/Latinx	365	79.2
Missing	4	0.9
Educational background		
Some grade school	3	0.7
Some high school	18	3.9
High school diploma/GED	39	8.5
Some college or two-year degree	104	22.6
Four-year college degree	113	24.5
Post-college education	32	6.9
Graduate or professional degree	147	31.9
Missing	5	1.1

*Except for Age (SD).
**Participants endorsed multiple races.

RESULTS

Of the 461 participants in the study, 448 (97.2%) began the survey portion of the study, and 445 (96.5%) completed the survey.

Perceived stress was related to age ($r = -0.44$, p < .001), such that greater stress was related to younger age. Perceived stress differed by gender ($t (443) = -4.8$, p < 0.001), with women ((n = 311): M = 16.2, SD = 6.7) reporting greater perceived stress than men ((n = 134): M = 12.8, SD = 6.9). Perceived stress also differed by ethnicity ($t (145.8) = -3.5$, p = 0.001), with Hispanic or Latinx individuals (M = 17.4, SD = 6.3) reporting more perceived stress than non-Hispanic or Latinx individuals (M = 14.7, SD = 7.0). Individuals identifying as African American or Black reported significantly ($t (446) = 3.8$, p < 0.001) less perceived stress (M = 12.9, SD = 6.8) than non-African American or Black individuals (M = 15.9, SD = 6.8).

Worry about asymptomatic spread was recoded to reflect individuals who were not at all or slightly worried, as compared to those who reported moderate to extreme worry. Individuals reporting significant worry also reported greater perceived stress ((n = 266): M = 16.5, SD = 6.3) than individuals reporting minimal or no worry ((n = 181): M = 13.4, SD = 7.4), and this difference was significant between groups ($t (342.1) = -4.7$, p < 0.001). The amount of information individuals felt they knew regarding COVID-19 was not associated with perceived stress ($t (446) = 1.4$, p = 0.16; Figure 1).
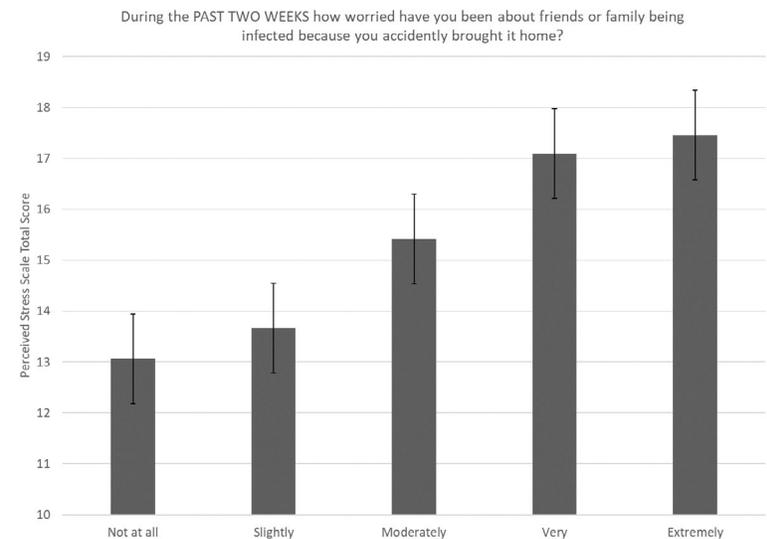

Figure 1. The relation between overall perceived stress and worry about asymptomatic spread.

When comparing those reporting symptoms of COVID-19, as defined by U.S. Centers for Disease Control and Prevention case definitions, to those who were not, significant differences were observed ($t (446) = -3.2$, p = 0.001). Symptomatic individuals reported higher perceived stress ((n = 81); M = 17.4, SD = 6.5) than asymptomatic individuals ((n = 367); M = 14.8, SD = 6.9). The number of COVID-related symptoms reported related to increased perceived stress ($r = 0.14$, p = 0.003).

DISCUSSION

We sought to provide insights into the correlates of perceived stress amidst the COVID-19 pandemic. Higher stress was reported among individuals who were female, Hispanic or Latinx, and non-Black or African American. Worry about asymptomatic spread (accidentally infecting family or friends) was associated with greater perceived stress. Perceived stress also was associated with the presence of COVID-19 symptoms.

Our findings aligned with prior research on women reporting higher levels of depression and anxiety symptoms during the pandemic.[8] Higher levels of stress among individuals identifying as Hispanic or Latinx aligned with one study indicating higher fear of COVID-19 in a similar group.[9] As reported in prior research, the presence of physical symptoms of COVID-19 also was associated with higher stress.[10]

Our findings represented a unique view of perceived stress among individuals testing for SARS-CoV-2 during government mandated stay-at-home orders. Even in the early stages of the pandemic, information about the risk of asymptomatic spread was growing in the scientific and lay press.[11] To our knowledge, no previous reports existed regarding concern about asymptomatic spread as they relate to distress, anxiety, or other mental health outcomes. It may not be possible or reasonable to reduce worry about asymptomatic spread, particularly given that such worry may promote prosocial and community-oriented behaviors. The impact of this worry on general distress, however, is a potential target for intervention, especially among individuals moving about communities more widely and concerned about propensity for asymptomatic spread.

Limitations. The current study examined self-reported variables, introducing potential social desirability, selection bias, or bias resulting from variability in health literacy. The data were cross-sectional, so no causal conclusions can be drawn. The convenience sampling design may overestimate concerns about COVID-19. Those seeking testing opportunities were likely to be more concerned and aware of the disease, and their opinions may not represent broader community concerns.

Prior to the lifting of the stay-at-home orders, the cases of COVID-19 were relatively low in the KCMA, at approximately 80 incident diagnoses per day.[12] This could underestimate the presence of stress as the influence of COVID-19 incidence on stress was unclear. Our findings may not generalize to higher incidence communities that may have been more disrupted by control measures.

CONCLUSIONS

The COVID-19 pandemic has not only taken hundreds of thousands of human lives, but it has caused significant economic, social, and health disruptions around the world. Distress was related significantly to concern over unintentionally contributing to the spread of SARS-CoV-2 through asymptomatic transmission. In addition to examining outcomes like distress, future research should characterize the modifiable psychotherapeutic processes that might be targeted through intervention among those experiencing distress.

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APPENDIX A

Self-Report Questions and Response Options

Domain	Specific Question	Response Options
COVID-19 Symptom Checklist	During the PAST TWO WEEKS have you had any of the following symptoms?	• Cough • Fever (101°F or greater) • Shortness of breath • Fatigue or feeling significantly tired from illness • Loss of sense of taste • Loss of sense of smell • Gastrointestinal symptoms (nausea, loss of appetite, diarrhea) • I don't have any symptoms
COVID-19 Knowledge	How much information do you feel you have about COVID-19?	• A lot • Some • A little • Nothing
Worry about Asymptomatic Spread	During the past two weeks, how worried have you been about friends or family being infected because you accidently brought it home?	• Not at all • Slightly • Moderately • Very • Extremely