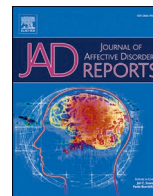




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Brief Report

COVID-19 epidemic-induced changes in mood and anxiety mediate the relationship between resilience and symptoms of depression and generalized anxiety in sexual assault survivors

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ABSTRACT

Background: Sexual assault survivors are a vulnerable sub-population that might be severely affected by the COVID-19 pandemic, yet received little research attention during this global crisis. Higher levels of resilience are generally associated with lower symptoms of depression and anxiety and are thus considered as promoting adjustment to stress. Here, we tested the associations between resilience, depression, and anxiety symptoms among sexual assault survivors during the COVID-19 epidemic. Pandemic-induced changes in mood and anxiety were also examined as potential mediators of the relations between resilience and clinical symptoms of depression and anxiety.

Methods: At the pandemic onset, 83 sexual assault survivors (66 females, average age=37.68±10.90 years) undergoing treatment at a specialized psychiatric outpatient clinic completed a survey aimed at identifying patients in distress during the lockdown. The survey included a battery of questionnaires assessing resilience, pandemic-induced changes in mood and anxiety, and clinical symptoms of depression and generalized anxiety.

Results: Resilience scores were significantly negatively correlated with both depression and generalized anxiety symptoms. Furthermore, pandemic-induced changes in mood and anxiety significantly mediated these effects.

Limitations: Due to the cross-sectional study design, a temporal relationship between pandemic induced changes (mood and anxiety) and clinical symptoms (depression and generalized anxiety) could not be determined.

Conclusions: Our findings highlight the need to develop interventions for reducing situational changes in mood and anxiety during periods of acute stress, while increasing resilience factors, in order to decrease the burden of stress on sexual assault survivors' mental health during the pandemic and beyond.

1. Introduction

The COVID-19 pandemic has posed major health challenges and induced fear and uncertainty on a global scale. Worldwide, governments have reacted to the threat of the pandemic by implementing lockdowns and quarantines, affecting many aspects of societal life (Jakovljevic et al., 2020). There is emerging evidence of the detrimental mental

health consequences for healthy populations, leading to higher rates of depression and anxiety (Liu et al., 2020). Vulnerable psychiatric populations are especially susceptible to the effects of lockdowns and quarantines, as was demonstrated both in prior epidemics (Brooks et al., 2020) and in the current one (Hao, 2020).

A specifically vulnerable psychiatric population comprises sexual assault survivors (SAS). Despite a high prevalence in the general

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population (a lifetime prevalence of 17–25% among women and 1–3% among men) (Dworkin et al., 2017) and an extremely high prevalence among psychiatric patients (40% of severely ill female patients and 12% of male patients) (Khalifeh, 2015), SAS have been sparsely studied as a group during major pandemics. Sexual assault survivors suffer from a range of psychiatric comorbidities and especially high rates of depression and anxiety (Hailes et al., 2019), a plethora of somatic health problems (Springer et al., 2003), elevated health anxiety (Reiser et al., 2014), high rates of functional impairment and disability (Schüssler-Fiorenza Rose et al., 2014), as well as reduced social support and lack of trust in others, leading to perceived or actual loneliness (Dagan and Yager, 2019). These unique characteristics and comorbidities suggest potentially heightened vulnerability in their response to acute stressors, such as the current worldwide COVID-19 pandemic.

Despite this high susceptibility to stressors among SAS, a large variance exists in their ability to adjust to life adversities and, alongside their psychiatric symptoms, many of them present high resilience (Domhardt et al., 2015). Resilience is known to reflect resourcefulness, enabling individuals to adapt well in the face of adversity, trauma, tragedy, or threat (American Psychological Association, 2010). It was previously found to moderate the effects of childhood trauma on adults' anxiety and depression outcomes (Poole et al., 2017; Wingo et al., 2010), and to protect against depression and generalized anxiety resulting from stressful life events among healthy populations (Sheerin et al., 2018). During the current epidemic, resilience was further shown to protect against anxiety and depression in healthy young adults (Liu et al., 2020), but its effects on the adjustment of SAS to the current global crisis received only little research attention.

Here, we aimed to address this knowledge gap by examining the relationship between resilience and clinical symptoms of depression and anxiety among SAS during the COVID-19 crisis in Israel. This cross-sectional study design was conducted in a specialized psychiatric clinic treating adult SAS, mostly survivors of childhood sexual abuse. Resilience was examined in relation to both specific COVID-19-induced changes (i.e., mood and anxiety changes) and standardized stable clinical measures (i.e., depression and generalized anxiety). Based on previous literature (Breno and Galupo, 2007; Simpson, 2010), we hypothesized that higher levels of resilience would be associated with lower levels of overall depression and anxiety among SAS. Furthermore, we expected that this effect would be mediated through an attenuated acute response to COVID-19-induced changes in mood and anxiety, respectively, proving individuals with a better ability to cope with acute stress.

2. Methods

2.1. Participants and procedure

All individuals participating in this study underwent treatment at a specialized public psychiatric outpatient clinic for adult SAS. Participants suffered from diverse psychiatric symptoms resulting from sexual assault and received long-term weekly psychotherapy sessions. This treatment, aiming at improving emotional regulation and interpersonal relations, is the standard treatment for sexual assault survivors. On March 15th, 2020, the Israeli government implemented a civilian lockdown as a preventive measure against the spread of COVID-19 in the country. Following the instructions provided by the Ministry of Health, patients could no longer visit psychiatric clinics to receive mental healthcare. Psychotherapy and medical attention continued through online video streaming services. A clinical survey was offered to patients using Qualtrics Insight Platform (Qualtrics, Provo, UT) from March 30th through July 30th, 2020, to aid in identifying patients in acute distress due to the pandemic. Patients' data were de-identified for research usage, and the study was approved by the Medical Center Ethics (Hel-sinki) Committee.

2.2. Measures

Visual Analog Scale (VAS) (Miller and Ferris, 1993) was used to index the degree of change in mood and anxiety levels due to the COVID-19 epidemic. Participants were asked "To what degree do you feel that the current COVID-19 crisis has affected your condition over the past week?", and had to move the cursor on the VAS ranging from "extreme deterioration" (−5) to "extreme improvement" (+5), with zero (0) indicating no pandemic-induced influences. Here, we focused on the VAS items which assessed "anxiety" and "mood". The current assessment method is well-established for indicating both anxiety and mood changes (Abend et al., 2014; Cline et al., 1992; Crichton, 2001; Mosimann, 2000).

The Patient Health Questionnaire 9 (PHQ-9) is a 9-item self-report scale used to assess depression severity. It was developed as a screening tool for depressive symptomatology and is also used as a diagnostic measure of major depressive disorder (Kroenke et al., 2001). The rating was done on a four-point scale, ranging from 0 (*not at all*) to 3 (*very much*), and summed with higher scores indicating higher levels of depression (range 0–27). Cronbach's alpha for the current sample was 0.89, indicating high reliability.

The Generalized Anxiety Disorder (GAD-7) scale is a 7-item self-report scale used to assess generalized anxiety symptoms (Spitzer et al., 2006). Participants were asked to rate how often they were bothered by 7 different anxiety symptoms in the past two weeks. The rating was done on a four-point scale, ranging from 0 (*not at all*) to 3 (*very much*), and summed with higher scores indicating higher levels of anxiety (range 0–21). Cronbach's alpha for the current sample was 0.88, indicating high reliability.

The Connor-Davidson Resilience Scale (CD-RISC) short version is a 10-item self-report scale used to assess resilience capacity (Connor and Davidson, 2003). It reflects the ability to tolerate experiences such as change, personal problems, illness, pressure, failure, and painful feelings. Participants were asked to rate on a five-point scale, ranging from 0 (*not at all*) to 4 (*almost all the time*), how often they felt that the examples were true for them, with higher scores indicating higher levels of resilience (range 0–40). Cronbach's alpha for the current sample was 0.84, indicating high reliability.

2.3. Data analysis

Pearson correlations were computed to examine the associations between resilience, depression, and anxiety. To examine possible mediation effects of pandemic-induced changes in anxiety and mood on the association between resilience to anxiety and depression, respectively, mediation analysis with bootstrapping was performed using PROCESS macro (Hayes, 2012) for SPSS (Version 22). Statistical significance of the mediation effects was determined both by the confidence interval (CI) of the indirect effect and by the Sobel test for the significance of mediation effects (Sobel, 1982). Missing data analysis revealed that, across variables, 0–19% of values were missing. Little's missing completely at random model revealed that the data were missing completely at random ($\chi^2(80)=95.041, p = 0.12$), thus it was handled by maximum likelihood estimations based on all study variables.

3. Results

Socio-demographic information and clinical variables of the study's participants are presented in Table 1, and correlation matrix between the clinical variables is presented in Table 2.

As expected, resilience was significantly negatively correlated with both depression ($r=-0.43, p<0.001$) and anxiety symptoms ($r=-0.35, p = 0.001$). Consistent with our hypothesis, a significant mediation effect was revealed between resilience and anxiety, indicating that the indirect effect of resilience on anxiety symptoms through COVID-19

Table 1
Study sample characteristics.

Descriptives	N	%	M (SD)
Age	83		37.68 (10.90)
Gender (Female)	66	79.5	
Years of education	81	–	14.18 (3.14)
Marital Status			
Married/In a relationship	35	42.2	
Divorced	7	8.4	
Single	39	47	
Other	2	2.4	
Employed during COVID-19	34	41	
Recognized psychiatric disability	41	49.4	
Prescribed psychiatric medication (one or more)	77	92.8	
Variables:			
VAS mood change (–5 to +5)	72		–0.72 (2.54)
VAS anxiety change (–5 to +5)	67		–1.33 (2.25)
PHQ-9 (0–27)	82		20.53 (6.32)
GAD-7 (0–21)	83		14.39 (4.94)
CD-RISC (0–40)	81		29.58 (9.18)

N=sample size;%=percentage of sample size; M = mean; SD = standard deviation.

Table 2
Correlation matrix between clinical measures.

	Anxiety GAD-7	Depression PHQ-9	VAS- mood change	VAS- anxiety change	Resilience CD-RISC
Anxiety GAD-7	1	0.641**	–0.341*	–0.408**	–0.387**
Depression PHQ-9	–	1	–0.362**	–0.154	–0.476**
VAS-mood change	–	–	1	0.432**	0.211
VAS- anxiety change	–	–	–	1	–0.387**
Resilience CD-RISC	–	–	–	–	1

* $p < .05$. ** $p < .01$. *** $p < .001$.

GAD-7: Generalized Anxiety Disorder Questioner, PHQ-15: Patient Health Questionnaire 9, VAS-mood: visual analog scale mood change, VAS-anxiety: visual analog scale anxiety change, CD-RISC: Connor-Davidson Resilience Scale.

induced changes in anxiety was statistically significant (95% CI of the indirect effect ranged from –0.135 to –0.014; Sobel test’s $Z = -2.27$, $p = 0.020$) (Fig. 1A). Similarly, an additional significant mediation effect was found between resilience and depression, such that the indirect effect of resilience on depressive symptoms through COVID-19 induced changes in mood was statistically significant (95% CI of the indirect effect ranged from –0.134 to –0.016; Sobel test’s $Z = -2.08$, $p = 0.030$)

(Fig. 1B).

4. Discussion

The current study revealed associations between resilience, depression, and anxiety at the onset of the COVID-19 crisis among a clinical population of SAS. Confirming our study hypotheses, we found that resilience was negatively correlated with both depression and generalized anxiety, and that acute changes in mood and anxiety, induced by the COVID-19 pandemic, significantly mediated these effects. To the best of our knowledge, this is one of the first studies which examined the effects of the COVID-19 epidemic on SAS, a uniquely vulnerable psychiatric population during acute stress periods, and the first to demonstrate the role of resilience among this specific population during COVID-19.

Generally, results from this work extend previous findings regarding the protective qualities of resilience for both anxiety and depression in healthy individuals during COVID-19 (Lai, 2020), illuminating the shielding role of resilience among SAS. This supports the protective effects of psychological resilience on psychopathology, even in individuals who have endured prior trauma and may therefore be at heightened risk for mental deterioration (Scali, 2012).

The underlying mechanisms of change in mood and anxiety and the specific characteristics of SAS may help shed light on the results of this study. Specifically, mood is affected by constructs of resilience such as optimism, cognitive flexibility, social support networks, and sense of community among SAS (Domhardt et al., 2015). In times of lockdown, quarantine, and social distancing, as have been introduced by the current pandemic, social support and a sense of community have been immensely challenged, leading to the demonstrated mood shift. Although we did not address these issues directly in this study, such specific characteristics explaining the difficulties in social support networks for SAS have been described previously. Namely, they include a lack of trust in others, feelings of shame, a loss of familial support stemming from incest, and difficulties regulating emotion and behavior, leading to social difficulties and a general feeling of loneliness and solitude (Dagan and Yager, 2019). Collectively, these features suggest a vicious cycle such that heightened feelings of loneliness and worry lead to even more isolation that in turn causes SAS to be less likely to rely on social networks in times of need (Gibson and Hartshorne, 1996), lowering their resilience and suggesting a high risk for worsening feelings of loneliness, leading to changes in mood and resulting in depression and anxiety.

This cycle emphasizes the emerging notion that resilience plays a pivotal role in shielding psychiatric patients from depression and anxiety symptoms throughout life, and specifically during responses to stressful life events via the regulation of mood and anxiety changes. Interventions that aim to improve resilience levels might hold promise

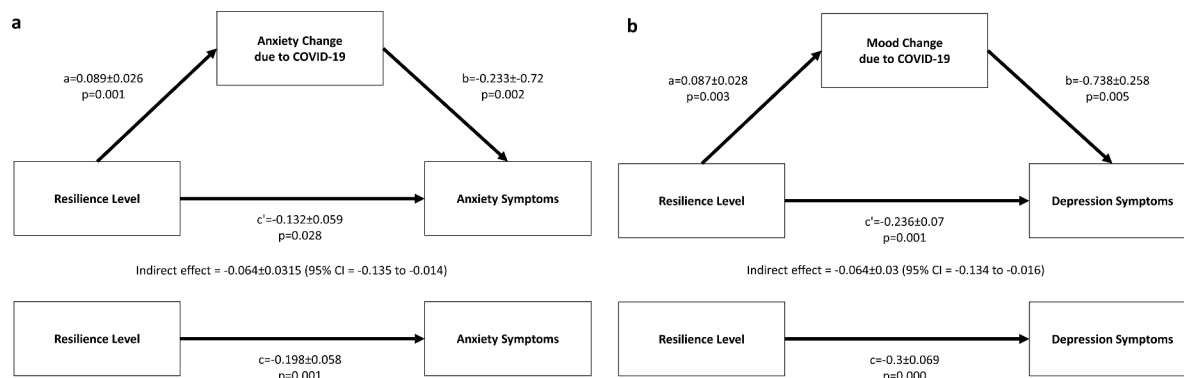


Fig. 1. Mediation Analysis Results. Path diagrams depicting the indirect effects of resilience on (A) anxiety symptoms through COVID-19 induced anxiety change and (B) depression symptoms through COVID-19 induced mood change.

during major acute crises such as COVID-19 and beyond (Shrivastava and Desousa, 2016; Vinkers et al., 2020). Examples of such interventions might include mindfulness practices, cognitive reappraisal methods, physical activity, and community consolidation (Averill, 2018).

Although findings are promising, several limitations of this work must be noted. First, the cross-sectional design here did not allow establishing a temporal relationship between pandemic-induced changes (mood and anxiety) and clinical symptoms (depression and generalized anxiety). That is, we cannot determine if depression and generalized anxiety scores reflected pre-COVID-19 psychopathology, or emerged during the pandemic. Second, this study uniquely focused on SAS who received weekly psychotherapy for trauma-related problems, curbing the study's generalizability to non-symptomatic or non-treated SAS populations, who should be further studied separately. Finally, additional factors might have played a role in the findings of this study, such as the length of treatment that was provided before the pandemic, and should be further investigated in future research. That said, previous research did not find a link between length of treatment and resilience levels ((Latimer et al., 2000)).

In conclusion, this work provides initial supportive evidence for the protective effects of resilience on depression and anxiety among SAS, specifically mediated by COVID-19 induced changes in mood and anxiety. These findings may assist in the screening of individuals at risk of mental deterioration during global crises, and further facilitate the development of specific emergency interventions aimed at promoting resilience and targeting mood and anxiety regulation among SAS.

Author contributions

All authors provided substantial contributions to the work. DA and KG conceptualized the study and DA executed the study. NF and ZBZ performed the analyses and all authors contributed to the interpretation of the results and wrote the manuscript.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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