Journal of Positive Psychology & Wellbeing http://journalppw.com
2024, Vol. 8, No. 2, 139-150 ISSN 2587-0130

Mental Health During Covid-19: Understanding The Role Of Stress And Resilience

Namrata[1], Saif R. Farooqi[2]

[1]Assistant Professor, Department of Humanities and Social Sciences, Maulana Azad National Institute of Technology (MANIT), Bhopal, India. E-Mail: Namrata.Edu@Gmail.Com
[2]Assistant Professor, Department of Psychology, Faculty of Social Sciences, Jamia Millia Islamia, New Delhi, India. Email: Saif.Farooqi@Gmail.Com

Abstract

Background COVID-19 is one of the most stressful life experiences worldwide in recent times. This has triggered common mental health problems among people. Given the impact and lacunae in existing literature, it is significant to understand the risks as well as protective factors associated with mental health.

Aims The study thus aimed to examine the role of stress and resilience in mental health in the general population during COVID-19.

Method A total of 397 individuals (192 males and 205 females) ranging from 18-40 years, participated in an online survey. Self-report measures Adult Self-Report Response to Stress Questionnaire (RSQ), Connor-Davidson Resilience Scale (CD-RISC-25), and General Health Questionnaire (GHQ-12) were used to examine the COVID-19 stress, resilience, and mental health, respectively. Pearson product moment correlation analysis was used to assess the associations between stress, resilience and mental health. Hierarchical regression analysis was used to examine the predictors of mental health.

Results Results showed that stress and resilience significantly predicted mental health. This suggests that high stress leads to negative outcomes on mental health, and high resilience helps in coping with mental health issues. Results also showed that gender significantly predicted mental health. Specifically, females being more affected by mental health problems as compared to males.

Conclusion The study suggests that enhancing resilience and minimising stress may improve the mental health conditions of individuals during difficult times. Also, females were found to be more susceptible to mental health issues, therefore, special intervention programs should be designed for them.

Keywords*:* Stress, Resilience, Mental Health, COVID-19

Introduction

The novel coronavirus first originated in Wuhan, China, officially declared as a pandemic by the World Health Organisation (WHO) on March 11, 2020 (Anand et al., 2020; Cucinotta & Vanelli, 2020). As compared to SARS, coronavirus has been more dangerous in terms of rapid transmission of infection (Liu et al., 2020; Rocklöv et al., 2020), higher mortality rate and uncertain cause of spread (Guan et al., 2020). As of March 30th, 2020, over 720,000 confirmed cases and 33,000 deaths were reported (Rajkumar, 2020). As a

result, many countries introduced public health measures such as stay at home, lockdown, quarantine, social distancing, school and organisational closure, and travel restrictions to stop coronavirus spread. Due to this pandemic, people have not just lost their lives but also it has caused several psychological issues (Rubin & Wessely, 2020; Xiang et al., 2020).

During the SARS epidemic, PTSD, stress, and psychological distress among patients and clinicians increased (Lee et al., 2007). In the case of COVID-19, evidence suggests that the most common psychological problems identified are anxiety, depression, stress, and insomnia among the general population. In China, anxiety and depression reported around 16–28%, and 8% have reported stress (Rajkumar, 2020). The effect on mental health will occur immediately following such events and then continue for a long time (Galea, Merchant, & Lurie, 2020). COVID-19's impact on mental health, especially among general population, is, however, poorly understood.

According to previous studies, protective factors can minimise the harmful effects of negative life experiences on psychological health (Chi et al., 2016; Jamshidi et al., 2017). Resilience is one of the protective factors that has been discovered to help people overcome adversity and perceived stress. (Connor & Davidson, 2003; Luthar & Zigler, 1991). Resilience has been found to facilitate the well-being of individuals (Vinkers, Amelsvoort, Bisson, Branchi, & Cryan et al., 2020). The higher levels of resilience lead to lower levels of perceived stress (Wilks & Croom, 2008) and lower levels of resilience results in higher levels of stressful responses and mental illnesses (Tugade & Fredrickson, 2004).

Stress, COVID-19, and Mental Health

Stress is characterised as a specific relationship between internal and external factors that are deemed to be burdening or outstripping resources, placing one's health at risk. (Lazarus & Folkman, 1984). Internal factors may include personality, coping style, preceding mental disorders, and a family history of mental disorders. External factors may include catastrophic, stressful life events, and daily hassles. Stressful life events are uncontrollable, undesirable, or unscheduled and thus cause greater negative effects (Thoits, 1983, Wheaton, 1983). These involve major life stressors such as changes in family status (e.g. marriage, divorce, birth, or death), and changes in economic conditions (e.g. loss of a job, financial loss).

Anxiety and tension, as well as a decline in mental health and wellness, have been linked to stressful life events (Baum, Singer, & Baum, 1983; Troy & Mauss, 2011). While experiencing prolonged stress, these emotions get associated with tension, hypochondria, depression, demoralisation, and helplessness (Butler, 1993). This relationship between stress and negative mental health outcomes have been extensively discussed in the literature. According to the transactional model (Lazarus & Folkman, 1984), the levels of stress experienced by an individual depend on the perceived demands as well as the perceived resources available. Individual and group differences in terms of sensitivity and vulnerability, as well as interpretations and reactions to stressful events, also influence the stress level (Salleh, 2008).

The cognitive model suggests that individuals may develop a negative or maladaptive belief leading to psychological problems (Hammen & Rudolph, 2003; Hankin & Abela, 2005). Other vulnerability factors may include the interaction between psychosocial and environmental stressors and maladaptive beliefs (Grant et al., 2004). Further, these stressful events lead to decreased mental health such as depression, and, in turn, increases the level of stress, which shows the bidirectional relationship between stress and mental health (Grant et al., 2004).

COVID-19 has been regarded as a major traumatic life occurrence that has had a significant impact on people's mental health in a variety of ways. Unpredictability, confusion, the severity of the disease, disinformation, and social isolation (Zandifar & Badrfam, 2020; Zhang et al., 2020), the economic effects, as well as high levels of fear and panic behaviour,

such as resource hoarding and stockpiling (Shigemura et al., 2020), and the presence of misleading or inflated information in the media (Asmundson & Taylor, 2020a, 2020b) are some of the stressors involved.

This has resulted in many psychosocial problems such as depression, anxiety, and stress (Wang et al., 2020), feelings of loneliness and anger (Xiang et al., 2020), and high psychological distress and post-traumatic symptoms (Marazziti et al., 2020). Relevant groups have also been reported as being more susceptible to the COVID-19 outbreak's mental health impact. Females may be more vulnerable to developing PTSD as a result of infectious disease outbreaks than males (Lai et al., 2020; Liu et al., 2020; Sun et al., 2020). Older adults (Yang et al., 2020), the homeless (Tsai & Wilson, 2020), and immigrant workers (Liem et al., 2020) are among the others.

Resilience, COVID-19, and Mental Health

Research on protective factors suggests that resilience plays a significant role in maintaining positive health outcomes (Arslan, 2019; Yıldırım & Belen, 2019; McDonnell & Semkovska, 2020). Resilience is viewed as an adaptive process and a stable concept. As an adaptive process, resilience is one's competence or ability to positively adapt, bounce back, recover or maintain mental health despite experiencing any stressful event or trauma (American Psychological Association, 2015; Garmezy, 1993; Masten, Best, & Garmezy, 1990; Smith et al., 2008; Wald et al., 2006). As a stable concept, resilience is a steady path of mental health despite experiencing serious trauma (Bonanno, 2004). These two concepts have one thing in common: resilience exists in the face of adversity.

Resilience as personal attributes involves self-esteem and hardiness. These attributes help individuals to cope successfully with stressful events (Crawford, Wright, & Masten, 2005). Apart from personal attributes, resilience incorporates social environments and a supportive family (Connor & Davidson, 2003) as well as the collective ability to overcome the adverse effects of trauma (Adger, 2000; Panter-Brick & Eggerman, 2012). Moreover, resilience is a dynamic process and gets modified according to the cultural and historical context and varies across age and gender (Connor & Davidson, 2003).

Studies have indicated that resilience has a beneficial effect on a multitude of mental health and well-being (Arslan, 2019; McDonnell & Semkovska, 2020). Yildirim (2019) discovered that resilience is positively related to life satisfaction, positive affect, and maintaining affect balance, and is inversely related to negative affect. Resilience can also help to mitigate the harmful effects of traumatic experiences on the progression of PTSD (Lee, Ahn, Jeong, Chae, & Choi, 2014). In addition to these immediate consequences, resilience has been shown to mediate the interaction between coping and well-being (Tomás, Sancho, Melendez, & Mayordomo, 2012).

During COVID-19, research revealed that resilience has an important and clear predictive impact on subjective well-being and psychological wellbeing (Yildirim & Arsalan, 2020). Resilience was also shown to mediate the association between positive and negative affect, as well as psychological wellbeing (Arslan & Yildirim, 2020), and between fear-related with COVID-19, perceived risk, stress, anxiety, and depression (Yildirim, Özaslan & Arslan, 2020). Thus, enhancing resilience has been suggested to be an essential means to overcome the negative outcomes during the COVID−19 pandemic (Rosenberg, 2020).

The present study

Given the risk factors associated with COVID-19 and its possible consequences that have resulted in a variety of mental health problems such as anxiety and depression among people across the globe, it is vital to understand the negative and positive factors associated with mental health in times of COVID-19 outbreak. The examination of such relationships would help in surviving and developing interventions to overcome the crisis in forthcoming disasters like this. Thus, the present study aimed to examine the associations between stress, resilience, and mental health in individuals

during the COVID-19. Thus, we hypothesized that (a) stress would significantly (negatively) influence mental health, (b) resilience would significantly (positively) influence mental health, and (c) females would have poorer mental health as compared to males.

Method

Participants

A total of 397 individuals[female=205 (51.6%) and male= 192 (48.4%)], ranging from 18-40 years (M = 24.32, SD = 6.43) participated. Participants belonged to different parts of the country-North=90 (22.7%), South=53 (13.4%), East=152 (38.3%) and West= 102 (25.7%), and had levels of education with Senior Secondary=125 (31.5%), Graduate=91 (22.9%), Post Graduate=130 (32.7%), and PhD=51 (12.8%) holding university degrees.

Measures

COVID-19 Stress

The stress due to COVID-19 was measured by the adapted version of the Adult Self-Report Response to Stress Questionnaire (RSQ)-COVID-19. The RSQ (Connor-Smith et al. 2000) consists of 57-items measuring specific voluntary/controlled and involuntary/automatic coping strategies to the stressors participants encountered in the past 6 months. It starts with a list of stressors related to COVID-19 that they may have encountered. For this study, we took only the stress scale consisted of 15 different areas of stressors related to COVID-19. Stressors such as financial crisis, unable to perform routine activities, lack of social support, hearing about distressing news, fear of getting oneself and love ones infected, lack of medical care and goods, academic as well as work. The participant rates how often each stressor has occurred in the past 6 months on a scale of 1 (Not at all) to 5 (Very high). A total score can be assessed by summing all 15 items and scores can range from 15 to 75. High scores on this scale represent high stress. The Cronbach alpha for this study's sample is .84.

Resilience

To measure resilience, the Connor-Davidson Resilience Scale (CD-RISC-25) was adapted for this study. Kathryn M. Conner and Jonathan R.T. Davidson developed this scale in 2003. It is a self-report scale that consists of 25 items that carry a 5-point range of responses as follows: strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). A total score can be assessed by summing all 25 items and scores can range from 25 to 125. High scores on this scale indicate high resilience. The responded rates based on how the subject has felt over the past month. The Cronbach alpha on the sample in this study is .90.

Mental Health

The mental health of the participants was assessed using an adapted version of the General Health Questionnaire (GHQ-12), developed by Goldberg and Williams (1991). The items in this scale include the inability to perform normal tasks and the appearance of new and distressing experiences. The scale measures clinical symptomatology and asks whether the respondent has experienced a symptom or behaviour recently. It includes 12 items using a 5-point Likert scale from 1 (Never) to 5 (Always). Each item measures the severity of a mental health problem over the past few weeks. Items 1, 3, 4, 7, 8, and 12 were reverse-scored on this scale. The sum of all 12 elements yields a cumulative ranking, which can range from 12 to 60 points. Higher the score, poorer the mental health. The sample in this analysis has a Cronbach alpha of.80.

Procedure

Between July and August 2020, an online survey was conducted considering that data obtained from the internet is reliable and valid (Gosling et al., 2004). The questionnaires were developed using Google form. Participants were contacted via WhatsApp and emails, which took approximately 15-20 minutes to complete. Interested participants were provided with a link explaining a brief description of the study. Participants were requested to complete an informed consent form before completing

the survey. They were briefed about the intent of the study and if they are not willing to participate, they could leave the survey at any time. In the survey, after providing written informed consent, participants were directed to three separate online scales along with demographic information. Due to institutional closure during the countrywide lockdown, permission from the institutional ethical committee was not possible. However, the procedures that were carried out in the study followed the institutional research committee's ethical standards. Also, the Helsinki declaration of 1964 and its later modifications or equivalent ethical standards for research concerning human subjects.

Results

Table 1 Descriptive statistics and bivariate correlations

S. No.	Variable	Mean	SD	1	2
1	COVID-19 Stress	43.80	10.77		
2	Mental Health	32.32	6.84	.25**	
3	Resilience	90.23	14.48	-.02	-.54**

Note. *p<.05, **p<.01

Table 1 shows the descriptive and bivariate analysis for measured variables included in the study. The result showed a significant positive relationship between COVID-19 stress and mental health, but no significant relationship was found between COVID-19 stress and resilience. A significant negative relationship was also found between resilience and mental health, indicating that higher resilience is associated with lesser mental health issues.

Table 2 Hierarchical Regression of COVID-19 Stress and Resilience in Mental Health

	Model 1			Model 2			Model 3		
	B	*β*	*SE*	*B*	*β*	*SE*	*B*	*β*	*SE*
Gender	1.794**	.131**	.682	1.851**	.135**	.661	1.616**	.118**	.551
Stress				.160***	.252***	.031	.154***	.242***	.026
Resilience							-.251***	-.532***	.019
(Constant)		31.396***			24.347***			47.419***	
R^2		.017			.081			.363	
ΔR^2		-			.064			.283	
F		6.913**			17.315***			74.753***	

Note. N=397. Model 1 included gender, Model 2 included COVID-19 stress additionally, and Model 3 included resilience along with COVID-19 stress and mental health. Male=0, female=1. *p<.05, **p<.01; ***p<.001

Table 2 shows the result of hierarchical regression analysis. Model 1 includes only gender and shows that gender is significantly associated with mental health F (1, 395) = 6.913, p<.01 and 1% of the variance is explained by the model. Model 2 includes COVID-19 stress along with gender. The result shows that COVID-19 stress significantly explains mental health F (2, 394)=17.315, p<.001 and this variable explains an additional 8.1% of the variation in mental health. Model 3 includes resilience and explains an additional 28.3% of the variance in mental health and this change in R2 is also significant, F (3, 393) = 74.753, p<.001. In the final adjusted model, resilience (β = -.532, p<.001), COVID-19 stress (β= .242, p<.001) and gender (β=.118, p<.01) are significantly predicting mental health.

Discussion

The present study aimed to examine the predictors of mental health. The findings supported the hypotheses that stress, resilience, and gender significantly predicted mental health.

The present study showed that COVID-19 stress significantly positively predicted mental health, which was consistent with findings from the previous studies (Bai et al., 2004; Bao et al., 2020; Brooks et al., 2020; Cava et al., 2005; Santini et al., 2020). Various risk factors associated with COVID-19 outbreak contributing to stress and mental illness were reported such as uncertain and severeness of the disease, and misinformation and social isolation during the outbreak (Zandifar & Badrfam, 2020), the economic impact of COVID-19 on well-being in the general population such as high levels of fear and panic behaviour resulting in hoarding and stockpiling of resources (Shigemura et al., 2020), fears of infection for oneself and close ones, inadequate supplies of medicines and goods, including the interruption of regular medical follow-ups and difficulties in renewing prescriptions; and the lack of transparency in the information provided by health and government officials (Brooks et al., 2020). Other pertinent factors include social distancing and extended period of separation, which have resulted in increased symptoms of depression, anxiety, psychological distress, emotional disturbance, exhaustion, irritability, anger, insomnia, posttraumatic stress symptoms, and increased use of alcohol and tobacco (Brooks et al., 2020; Chen & Feeley, 2014; Hawryluck et al., 2004; Santini et al., 2020). The lack of social support and a sense of loneliness was frequently found to cause boredom, frustration, and a sense of isolation from the rest of the world and loved ones, which was upsetting to respondents and even intensified by unable to participate in routine events (Brooks et al., 2020). Furthermore, getting false and misleading information during the epidemic could exacerbate anxiety, leading to emotional issues such as frequent health checks, refusing medical treatment even while sick, and stockpiling specific products (Asmundson & Taylor, 2020a, b).

The findings showed that resilience had significantly negatively predicted mental health- high resilience led to lesser mental health issues. Thus, people with high resilience, when facing negative life events, are less likely to encounter emotional problems such as depression and anxiety. This indicates that individuals in the present study with high resilience were able to cope well with the adverse events. This finding is consistent with the previous research (e.g. Friborg et al., 2001). Feder et al. (2009) explained that individuals with high resilience are felt positive emotions and thoughts, and look for external support from family, friends, and others in stressful conditions. As a result, resilience helps them to actively adjust during difficult times and further reduces mental health problems. In addition to this, resilience is the ability to bounce back from stressful situations (Smith et al., 2008) as well as people with high levels of resilience can easily adapt to the changing environment (Frydenberg, 2004).

Additionally, a gender difference was found in the present study. Females scored higher than males on mental health ($t= 2.629$, $p<0.01$). In other words, the female mental health was worse than their male counterparts. The findings can be supported by the previous studies (Hong et al., 2009; Jiang et al., 2020; Lai et al., 2020; Liu et al., 2020; Mak et al., 2010; National Centre for Health Statistics, 2020; National Center for Injury Prevention and Control, 2020; Sun et al., 2020). Further, females report more about their negative life experiences and sentiments, consequently, lowers their resilience (Parker & Hadzi-Pavlovic, 2004). Also, females are more vulnerable to challenges under high-stress situations (Maciejewski et al., 2001). Studies have also found that neurological responses are different in females during stressful events causing higher incidences of emotional problems (Eid et al., 2019; Goel et al., 2014). Moreover, females tend to adopt negative coping strategies when they face negative events, while males embrace positive coping approaches (Hampel & Petermann, 2005).

Conclusions

The mental health of the general population has been significantly affected, during the COVID-19 outbreak. Thus, the findings of the present study suggest that resilience could help individuals in preventing mental illnesses. As people with high resilience are less likely to show psychopathological symptoms, while those with low resilience are more likely to exhibit psychopathological symptoms. Resilience can be an essential target for psychological interventions aimed at improving mental health. Additionally, since females were found to be more vulnerable than males during the pandemic, potential initiatives should focus on the former and examine the magnitude of such outbreaks on them. Finally, the findings of this research can be used by policymakers to strengthen public and clinical intervention processes.

Declaration of Conflict of Interest

There is no conflict of interest.

Acknowledgements

This work is part of a project carried out in wake of spreading awareness about COVID-19 initiated by the Government of India, NIT Council of India. The authors thank all volunteers who participated in this study, as well as those who helped in collecting the data.

Ethics approval

This study involves human participants with written informed consent from all subjects. It is in accordance with the declaration of Helsinki. Participants gave informed consent to participate in the study before taking part.

Reference

1. Adger, W.N. (2000). Social and ecological resilience: Are they related?. Progress in Human Geography, 24 (3), 347-364. 10.1191/030913200701540465.
2. American Psychological Association (2015). The Road to Resilience. Retrieved from http://www.apa.org/helpcenter/road-resilience.aspx.
3. Anand, K.B., Karade, S. Sen, S., & Gupta, R.M. (2020). SARS-CoV-2: Camazotz's curse. Medical Journal Armed Forces India, 76, 136-141. 10.1016/j.mjafi.2020.04.008.
4. Arslan, G. (2019). Mediating role of the self–esteem and resilience in the association between social exclusion and life satisfaction among adolescents. Personality and Individual Differences, 151, 109514.
5. Arslan, G., & Yıldırım, M. (2020). Coronavirus stress, meaningful living, optimism, and depressive symptoms: A study of moderated mediation model. Submitted for publication.
6. Asmundson, G.J.G., & Taylor, S., (2020a). Coronaphobia: Fear and the 2019-nCoV outbreak. Journal of Anxiety Disorder, 70, 102196.
7. Asmundson, G.J.G., & Taylor, S., (2020b). How health anxiety influences responses to viral outbreaks like COVID-19: What all decision-makers, health authorities, and health care professionals need to know. Journal of Anxiety Disorder, 71, 102211. 10.1016/j.janxdis.2020.102211.
8. Bai, Y., Lin, C.-C., Lin, C.-Y., Chen, J.-Y., Chue, C.-M., & Chou, P. (2004). Survey of stress reactions among health care workers involved with the SARS outbreak. Psychiatric Services, 55, 1055–57. 10.1176/appi.ps.55.9.1055.
9. Bao, Y., Sun, Y., Meng, S., Shi, J., & Lu, L., (2020). 2019-nCoV epidemic: Address mental health care to empower society. Lancet, 22(395), e37–e38. 0.1016/S0140-6736(20)30309-3.
10. Baum, A., Singer, J. E., & Baum, C.S. (2010). Stress and the Environment. Journal of Social Issues 37(1), 4– 35. 10.1111/j.1540-4560.1981.tb01056.x.

11. Bonanno, G. A., Papa, A., Lalande, K., Westphal, M., & Coifman, K. (2004). The importance of being flexible: The ability to both enhance and suppress emotional expression predicts long-term adjustment. Psychological Science, 15, 482–487. http://dx.doi.org/10.1111/j.0956-7976.2004.00705.x
12. Brooks, S.K., Webster, R.K., Smith, L.E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G.J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. Lancet, 395, 912–920.
13. Butler, G. (1993). Stress management in general practice. Occasional Papers Royal College of General Practitioners,61 (iv-vi),1-42.
14. Cava, M.A., Fay, K.E., Beanlands, H.J., McCay, E.A., & Wignall, R. (2005). The experience of quarantine for individuals affected by SARS in Toronto. Public Health Nursing, 22, 398–406.
15. Chen, Y., & Feeley, T.H. (2014). Social support, social strain, loneliness, and well-being among older adults: An analysis of the health and retirement study. Journal of Social Personal Relationships, 31, 141–61.
16. Chi, P., Li, X., Du, H., Tam, C.C., Zhao, J., & Zhao, G. (2016). Does stigmatization wear down resilience? A longitudinal study among children affected by parental HIV. Personality and Individual Differences, 96, 159–163.
17. Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). Depress Anxiety, 18(2), 76-82. 10.1002/da.10113.
18. Connor-Smith, J. K., Compas, B. E., Wadsworth, M. E., Thomsen, A. H., & Saltzman, H. (2000). Responses to stress in adolescence: Measurement of coping and involuntary responses to stress. Journal of Consulting and Clinical Psychology, 68, 976–992.
19. Crawford, E., Wright, M., & Masten, A. (2005). Resilience and spirituality in youth. In E.C. Roehlkepartain, L.Wagener, P.L. Benson (Ed), The Handbook of Spiritual Development in Childhood and Adolescence. California, USA: Thousand Oaks.
20. Cucinotta, D., & Vanelli, M. (2020). WHO declares COVID-19 a pandemic. Acta Bio Medica Atenei Parmensis, 91(1), 157–160.
21. Eid, R.S., Gobinath, A.R., & Galea, L.A.M. (2019). Sex differences in depression: insights from clinical and preclinical studies. Progress in Neurobiology, 176, 86–102. https://doi.org/10.1016/j.pneurobio.2019.01.006.
22. Feder, A., Nestler, E.J., & Charney, D.S. (2009). Psychobiology and molecular genetics of resilience. Nature Reviews Neuroscience, 10(6), 446–457.
23. Friborg, O., Hjemdal, O., Martinussen, M., & Rosenvinge, J.H. (2001). Preliminary results from the development and validation of a Norwegian scale for measuring adult resilience. Journal of Norwegian Psychology Assessment 38(4), 310–317.
24. Frydenberg, E. (2004). Coping competencies: What to teach and when. Theory Into Practice, 43(1), 14-22.
25. Galea, S., Merchant, R.M., & Lurie, N. (2020). The Mental Health Consequences of COVID-19 and Physical Distancing: The Need for Prevention and Early Intervention. JAMA Intern Med, 180(6), 817-818. doi:10.1001/jamainternmed.2020.1562.
26. Garmezy, N. (1993). Vulnerability and resilience. In D. C. Funder, R. D. Parke, C. Tomlinson-Keesey, & K. Widaman (Eds.), Studying lives through time: Approaches to personality and development (pp. 377-398). Washington, DC: American Psychological Association.
27. Goel, N., Workman, J.L., Lee, T.F., Innala, L., & Viau, V. (2014). Sex differences in the HPA axis.

Comprehensive Physiology, 4 (3), 1121-1155. https://doi.org/10.1002/cphy.c130054.
28. Goldberg, D., & Williams, P. (1991). A user's guide to the general health questionnaire. London: Nfer-Nelson.
29. Gosling, S. D, Vazire, S., Srivastava, S., & John, O. (2004). Should we trust web-based studies? A comparative analysis of six preconceptions about internet questionnaires. American Psychologist 59(2), 93-104.
30. Grant, K. E., Compas, B. E., Thurm, A. E., McMahon, S. D., & Gipson, P. Y. (2004). Stressors and child and adolescent psychopathology: Measurement issues and prospective effects. Journal of Clinical Child & Adolescent Psychology, 334, 412–425.
31. Guan, W.-J., Ni, Z.-Y., Hu, Y., Liang, W.-H., Ou, C.-Q., He, J.-X., & Liu, L. et al. (2020). Clinical Characteristics of Coronavirus Disease 2019 in China. New England Journal of Medicine, 382,1708-1720. 10.1056/NEJMoa20020321708-1720.
32. Hammen, C., & Rudolph, K.D. (2003). Childhood mood disorders. In E.J. Mash, and R.A. Barkley (Eds.), Child psychopathology (pp. 233–278). New York: 2nd Guilford Press.
33. Hampel, P., & Petermann, F., (2005). Age and gender effects on coping in children and adolescents. Journal of Youth and Adolescence 34(2), 73–83.
34. Hankin, B.L. (2008). Stability of cognitive vulnerabilities to depression: A short-term prospective multiwave study. Journal of Abnormal Psychology, 117, 324–333. doi: 10.1037/0021-843X.117.2.324.
35. Hawryluck, L., Gold, W.L., Robinson, S., Pogorski, S., Galea, S., & Styra, R. (2004). SARS control and psychological effects of quarantine, Toronto, Canada. Emerging Infectious Disease, 10, 1206–12.
36. Hong, X., Currier, G. W., Zhao, X., Jiang, Y., Zhou, W., & Wei, J. (2009). Posttraumatic stress disorder in convalescent severe acute respiratory syndrome patients: A 4-year follow-up study. General Hospital Psychiatry, 31(6), 546–554. https://doi.org/10.1016/j.genhosppsych. 2009.06.008.
37. Jamshidi, M.A., Moghadam, M.F., Ghorbani, S., & Farhoush, M. (2017). Self-efficacy and resilience as mediators in the relationship between test anxiety and spiritual intelligence among high school students in Qom. Journal of Research on Religion & Health, 4(1), 7–21.
38. Jiang, X., Deng, L., Zhu, Y., Ji, H., Tao, L., Liu, L., & Yang, D. et al. (2020). Psychological crisis intervention during the outbreak period of new coronavirus pneumonia from experience in Shanghai. Psychiatry Research, 286, 112903. 10.1016/j.psychres.2020.112903.
39. Lai, J. S. Ma, Y. Wang, Cai, Z., Hu, J., Wei, N., & Wu, J. et al. (2019). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease. JAMA Network Open, 3(3), 203976. 10.1001/jamanetworkopen.2020.3976.
40. Lazarus, R.S., & Folkman, S. (1984). Stress, Appraisal and Coping. New York: Springer.
41. Lee, A.M., Wong, J.G., & McAlonan, G.M., Cheung, V., Cheung, C., Sham, P.C., & Chu, C.-M. et al. (2007). Stress and psychological distress among SARS survivors 1 year after the outbreak. Canadian Journal of Psychiatry, 52(4), 233-240. 10.1177/070674370705200405.
42. Lee, Jong-Sun, Ahn, Yeon-Soon, Jeong, Kyoung-Sook, Chae, Jeong-Ho, & Choi, Kyeong-Sook (2014). Resilience buffers the impact of traumatic events on the development of PTSD symptoms in firefighters. Journal of Affect Disorder, 162, 128-33. 10.1016/j.jad.2014.02.031.
43. Liem, A., Wang, C., Wariyanti, Y., Latkin, C.A., & Hall, B.J. (2020). The neglected health of international

migrant workers in the COVID-19 epidemic. Lancet Psychiatry, 7(4), 20.
44. Liu, N., Zhang, F., Wei, C., Jia, Y., Shang, Z., Sun, L., & Wu, L. et al. (2020). Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: gender differences matter. Psychiatry Research, 287, 112921. 10.1016/j.psychres.2020.112921.
45. Luthar, S.S., & Zigler, E. (1991). Vulnerability and competence: A review of research on resilience in childhood. American Journal of Orthopsychiatry, 61(1), 6–22.
46. Maciejewski, P.K., Prigerson, H.G., Mazure, C.M. (2001). Sex differences in event-related risk for major depression. Psychological Medicine, 31(4), 593–604.
47. Mak, I. W. C., Chu, C. M., Pan, P. C., Yiu, M. G. C., Ho, S. C., & Chan, V. L. (2010). Risk factors for chronic post-traumatic stress disorder (PTSD) in SARS survivors. General Hospital Psychiatry, 32(6), 590–598. https://doi.org/10.1016/j.genhosppsych.2010.07.007.
48. Marazziti, D., Pozza, A., Di Giuseppe, M., & Conversano, C. (2020). The psycho-social impact of COVID-19 pandemic in Italy: A lesson for mental health prevention in the first severely hit European country. Psychological Trauma, 12, 531–533.10.1037/tra0000687.
49. Masten, A. S., Best, K. M., & Garmezy, N. (1990). Resilience and development: Contributions from the study of children who overcome adversity. Development and Psychopathology, 2, 425-444.
50. McDonnell, S., & Semkovska, M. (2020). Resilience as mediator between extraversion, neuroticism, and depressive symptoms in university students. Journal of Positive Psychology and Wellbeing, 4(1), 26-40.
51. National Center for Injury Prevention and Control (2020). KFF analysis of Centers for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System (WISQARS) (2008 and 2018). Retrieved from https://webappa.cdc.gov/sasweb/ncipc/mortrate.html.
52. National Centre for Health Statistics (Oct 7, 2020). Anxiety and Depression: Household Pulse Survey. Centres for Disease Control and Prevention. Retrieved from https://www.cdc.gov/nchs/covid19/pulse/mental-health.htm
53. Panter-Brick, C., & Eggerman, M. (2012). Understanding culture, resilience, and mental health: The production of hope. In M. Ungar (Ed.), The social ecology of resilience: A handbook of theory and practice (p. 369–386). Springer Science +Business Media.
54. Parker, G., & Hadzi-Pavlovic, D. (2004). Is the female preponderance in major depression secondary to a gender difference in specific anxiety disorders? Psychological Medicine 34(3), 461–470.
55. Rajkumar, R.P. (2020). COVID-19 and mental health: A review of the existing literature. Asian Journal of Psychiatry, 52, 1-5. 10.1016/j.ajp.2020.102066.
56. Rocklöv, J., Sjödin, H. , Wilder-Smith, A. (2020). COVID-19 outbreak on the Diamond Princess cruise ship: Estimating the epidemic potential and effectiveness of public health countermeasures. Journal of Travel Medicine, 27(3). 10.1093/jtm/taaa030.
57. Rosenberg, A.R. (2020). Cultivating Deliberate Resilience During the Coronavirus Disease 2019 Pandemic. JAMA Pediatrics, 174(9), 817-818.
58. Rubin, G.J., & Wessely, S. (2020). The psychological effects of quarantining a city. British Medical Journal, 368, 313.36810.1136/bmj.m313.
59. Salleh, M.R. (2008). Life event, stress, and illness. Malaysian Journal of Medical Sciences, 15(4), 9–18.
60. Santini, Z., Jose, P., Cornwell, E., Koyanagi, A., Nielsen, L., Hinrichsen,

C., & Meilstrup, C. et al. Social disconnectedness, perceived isolation, and symptoms of depression and anxiety among older Americans (NSHAP): a longitudinal mediation analysis. Lancet Public Health, 5, 62–70.

61. Shigemura, J., Ursano, R.J., Morganstein, J.C., Kurosawa, M., Benedek, D.M. (2020). Public responses to the novel 2019 coronavirus (2019 – nCoV): Mental health consequences and target populations. Psychiatry and Clinical Neurosciences, 74, 277–283. https://doi. org/10.1111/pcn.12988.
62. Smith, B.W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The Brief Resilience Scale: Assessing the Ability to Bounce Back. International Journal of Behavioral Medicine, 15, 194–200, 2008. 10.1080/10705500802222972.
63. Sun, N., Shi, S., Jiao, D., Song, R., Ma, L., Wang, H., & Wang, C. et al. (2020). A qualitative study on the psychological experience of caregivers of COVID-19 patients. American Journal of Infection Control, 48(6): 592–598.10.1016/j.ajic.2020.03.018.
64. Thoits, P.A. (1983). Dimensions of life events that influence psychological stress: An evaluation and synthesis of the literature. In H. B. Kaplan (Ed.), Psychosocial stress (pp. 33-104). New York: Academic.
65. Tomás, J. M., Sancho, P., Melendez, J. C., & Mayordomo, T. (2012). Resilience and coping as predictors of general well-being in the elderly: A structural equation modeling approach. Aging & Mental Health, 16(3), 317-326.
66. Troy, A. S., & Mauss, I. B. (2011). Resilience in the face of stress: Emotion regulation as a protective factor. In B. T. L. D.S. Chamey, & S.M. Southwick (Ed.), Resilience and Mental Health: Challenges Across the Lifespan (pp. 30-44). United Kingdom: Cambridge University Press.
67. Tsai J., & Wilson, M. (2020). COVID-19: A potential public health problem for homeless populations. Lancet Public Health, 5(4), 186-187. https://doi.org/10.1016/S2468-2667(20)30053-
68. Tugade, M.M., & Fredrickson, B. L. (2020). Resilient individuals use positive emotions to bounce back from negative emotional experiences. Journal of Personality and Social Psychology, 86(2), 320–333. 10.1037/0022-3514.86.2.320.
69. Vinkers, C. H., Amelsvoort, T., Bisson, J. I., Branchi, J., Cryan, J. F. Domschke, K., & Howes, O.D. et al. (2020). Stress resilience during the coronavirus pandemic. European Neuropsychopharmacology, 35, 12-16.
70. Wald, J., Taylor, S., Asmundson, G.J.G., Jang, K.L., & Stapleton, J. (2006). Literature review of concepts: Psychological resiliency. Final report W7711-057959/A. Toronto (ON): Defence R&D Canada.
71. Walsh, Z., Gonzalez, R., Crosby, K., Thiessen, M. S., Carroll, C., & Bonn-Miller, M. O. (2017). Medical cannabis and mental health: A guided systematic review. Clinical Psychology Review, 51, 15-29.
72. Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C.S., & Ho, R.C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. International Journal of Environmental and Public Health, 17(5), E1729.
73. Wheaton, B. (1983). Stress, personal coping resources, and psychiatric symptoms: An investigation of interactive models. Journal of Health and Social Behaviour, 24, 208-229.
74. Wilks, S.E., & Croom, B. (2008). Perceived stress and resilience in Alzheimer's disease caregivers: Testing moderation and mediation models of social support. Aging and Mental Health, 12(3), 357–365.

75. Xiang, Y.-.T. Xiang, Y.-.J. Zhao, Z.-.H. Liu, X.-H. Li, N. Zhao, T., & Cheung, C.H. (2020). The COVID-19 outbreak and psychiatric hospitals in China: Managing challenges through mental health service reform. International Journal of Biological Sciences, 16, 1741-1744. 10.7150/ijbs.45072.
76. Yang Y., Li W., Zhang Q., Zhang L., Cheung T., Xiang Y.-T. (2020). Mental health services for older adults in China during the COVID-19 outbreak. Lancet Psychiatry,7(4), 19.
77. Yao, H., Chen, J.H., & Xu, Y.F. (2020). Rethinking online mental health services in China during the COVID-19 epidemic. Asian Journal of Psychiatric, 50, 102015.10.1016/j.ajp.2020.102015.
78. Yildirim, M., & Arslan, G. (2020). Exploring the Associations Between Resilience, Dispositional Hope, Preventive Behaviours, Subjective Well-Being, and Psychological Health Among Adults During Early Stage of COVID-19. Psychology Archive Xiv. 10.31234/osf.io/vpu5qdoi:10.31234/osf.io/vpu5q.
79. Yildirim, M., & Belen, H. (2019). The role of resilience in the relationships between externality of happiness and subjective well-being and flourishing: A structural equation model approach. Journal of Positive Psychology and Wellbeing, 3(1), 62-76.
80. Yildirim, M., Ozaslan, A., & Arslan, G. (2020). Perceived risk and mental health problems among healthcare professionals during COVID-19 pandemic: Exploring the mediating effects of resilience and coronavirus fear. Psychology Archive, 14, 1–25. https://doi.org/10.31234/osf.io/ 84xju.
81. Zandifar, A., & Badrfam, R. (2020). Iranian mental health during the COVID-19 epidemic. Asian Journal of Psychiatric, 51, 101990.
82. Zhang, Y.H., Lin, D.J., Xiao, M.F., Wang, J.C., Wei, Y., Lei, Z.X. et al. (2019). Novel coronavirus infection in a three-month-old baby. Zhonghua Er Ke Za Zhi, 58(3), 182-184.