Original research

11

Mental health of people with chronic health conditions during a health crisis caused by COVID-19 pandemic

Krešimir Prijatelj
University of Zadar, Department of Psychology, Zadar, Croatia

Gordana Buljan Flander
Zagreb Child and Youth Protection Center, Zagreb, Croatia

Mirna Čagalj Farkas
Zagreb Child and Youth Protection Center, Zagreb, Croatia

Abstract

Previous research and clinical practice have shown that people with history of chronic diseases are more likely to develop certain mental health difficulties during pandemic. The aim of this study was to examine the relationship between chronic health conditions and mental health indicators during COVID-19. The data were collected as part of a broader research project of the Zagreb Child and Youth Protection Center. The study involved 1482 healthy individuals and 205 having a chronic disease. The assessments included sociodemographic data, the Hope for the Future and the Depression-Anxiety and Stress Scale-21. Results have shown statistically significant differences aspects of mental health in relation to living with chronic disease, in anxiety, stress and depression. In all scales, people with chronic disease achieved worse outcomes. Furthermore, chronic diseases lead to significant moderating effect on the relationship between hope for the future and anxiety. The negative correlation between hope for the future and mental health indicators is greater in people who have a chronic illness.

Keywords: mental health, chronic diseases, COVID-19

Introduction

Novel coronavirus (COVID-19) pandemic has been a major global health issue since the beginning of 2020. The number of confirmed cases and deaths from this disease has risen sharply since the onset of the pandemic, which initially originated in China's Hubei province. In January 2020, The World Health Organization declared COVID-19 disease international public health emergency (Mahase, 2020), and in March 2020 novel Coronavirus disease was declared a pandemic (WHO, 2020). The severity of the novel coronavirus disease, social isolation measures and information overload, some of which are false and not based on scientific evidence, could all lead to mental health distress in general population (Zandifar & Badrfam, 2020). Some authors suggest that the unpredictability and the uncertainty of the current situation can evoke stress reactions in all age groups, which in some people could even lead to PTSD related symptoms (Bao, Sun, Meng & Lu, 2020; Dutheil, Mondillon & Navel, 2020). Furthermore, impact of COVID-19 pandemic on human psychological well-being can be perceived through potential high levels of anxiety (Shigemura et. al., 2020). Also, some authors emphasize potential risk of high health anxiety levels due to high infectivity of coronavirus disease (Asmundson & Taylor, 2020). Another mental health consequence of current health crisis is depression, with prevalence in the general population increasing by 7% since the COVID-19 outbreak began (Mowbray, 2020). Existing literature review shows that besides COVID-19 pandemic greatly affecting physical health, it also negatively affects mental health of people from all around the world.

Furthermore, to this date, literature indicates a significant association between mental health difficulties and chronic diseases such as diabetes, cardiovascular disease, pneumonia (Mukeshimana & Chironda, 2019; Rosario & Masho, 2018), meaning that those who had chronic diseases are more likely to develop mental health disturbances. During pandemic, this risk could become even bigger, since it has been shown that people with chronic diseases are more likely to develop certain mental health difficulties during a pandemic (Brooks et al., 2020), which proved to be correct in the recent research during COVID-19 pandemic on the Croatian sample, where participants with chronic health conditions had higher concerns and more safety behaviours compared to those with no chronic conditions (Lauri Korajlija & Jokić Begić, 2020). COVID-19 symptoms have shown to be the most harmful for older individuals and for those who have various chronic diseases, such as diabetes, cardiovascular diseases, hypertension, asthma and stroke (Onder et al., 2020, Ruan et al., 2020, Yang et al., 2020). Individuals with cardiovascular disease show the greatest vulnerability to develop anxiety and depressive states during this period, while those with comorbid chronic diseases show the greatest vulnerability to stressful experiences and reactions (Sayeed et al., 2020). Besides that, previous research and clinical practice have shown that people with history of chronic diseases are at higher risk of more serious clinical manifestations from COVID-19 (Zhang et al., 2020). Additionally, COVID protection measures reduce the availability of routine medical care to individuals, especially in areas that are already facing limited health resources (Pellino and Spinelli, 2020). With the spread of the COVID virus, the fear of infection in the chronically ill grows, the movement of people is limited, and a sense of insecurity and uncertainty prevails. Many of the psychological problems faced by patients with chronic diseases in the current situation will potentially be neglected due to health system overload or measures to prevent the spread of the virus (Kang et al., 2020). This suggests that people with chronic illnesses will currently face a variety of mental health difficulties, such as anxiety, depression, confusion and stigma (Brooks et al., 2020), possibly making them one of the most vulnerable subpopulations during this period.

Moreover, given the global context of COVID-19 health crisis, it is expected that consequences will be long-term and involve various aspects of well-being. Erikson (1984) introduces the construct of belief in the species, which refers to the fundamental belief that life is basically good and worth liv-

ing, especially when one predicts what the future could look like. This concept includes two relatively independent subcomponents, trust in humanity and hope for a better future (McAdams et al., 1998). Hope for the future is a concept which describes optimism towards the future, hope for a better life for future generations and faith in the progress of humanity (Tucak Junaković, 2011), all three of which may be disturbed and impaired during prolonged periods of isolation and reduced welfare of general population.

Since during COVID-19 pandemic mental health problems can be overlooked in relation to physical health problems, it is important to stress out that both these aspects of health are closely related. Based on the literature review, it is clear that chronic diseases can make people more vulnerable to COVID-19 infection complications, as well as to developing mental health difficulties. To the best of the author's knowledge, this is the first study which puts emphasis on mental health risks for people with chronic health conditions during pandemic on Croatian sample. Furthermore, the aim of this study was to examine the level of depression, anxiety and stress in the Croatian sample during the pandemic between a group of individuals who state that they have chronic disease and those who state that they do not have chronic health condition. This study also investigates whether there is a moderating effect of chronic diseases on the relationship between hope for the future and anxiety, depression, and stress for the first time.

Material and methods

Participants

Participants (N = 1482) were Croatian citizens between the ages of 18 and 65 (M = 33,3). The majority of the sample consisted of women (n = 1230). At the time of data gathering, 205 participants stated that they have one or more of the following chronic health conditions: endocrinological (n=73), pulmonary (n=61), cardiovascular (n=59), locomotor (n=13), autoimmune (n=6), neurological (n=5), kidney disease (n=5), cancer (n=5), mental health (n=3).

Measures

Sociodemographic data were collected on gender, age, marital status, parental status, number of children and household size. Respondents were asked to state any history of chronic health conditions and whether being quarantined by a health authority.

Mental health status was measured using The Depression, Anxiety and Stress *Scale* (DASS-21; Lovibond & Lovibond, 1995). It is a self-report questionnaire consisting of 42 items, 14 items per subscale: depression, anxiety, and stress. Participants are asked to score every item on a four- point Likert-type scale, from 0 (did not apply to me at all) to 3 (applied to me completely). Final score is a linear combination of responses. Higher score indicates higher level of depression, anxiety and / or stress. In this study, the adapted and standardized version of DASS-21 was used (Reić Ercegovac & Penezić, 2012). The Cronbach's alpha coefficient for the stress subscale is .93, for the depression subscale .95, and for the anxiety subscale it is .90 (Reić Ercegovac & Penezić, 2012), The reliability of the DASS in this study population was $\alpha = .95$ for Depression subscale, $\alpha = .9$ for Anxiety subscale and $\alpha = .93$ for Stress subscale.

The hope for the future scale (Tucak Junaković, 2009) was constructed to examine hope for a better future. It is consisted of 8 statements which capture the belief that life is good and worth living, optimism about the future, hope that life will be better for future generations, etc. (e.g. "I hope to improve life in future generations."). Participants express the degree in which they agree with each statement on five-point Lik-

ert-type scale, from 1 (I do not agree at all) to 5 (I completely agree). Total score is presented as the average value of the estimates on the individual statements, so theoretically results can range between 1 and 5. Higher result indicates a more pronounced hope for a better future. The hope for the future scale was shown to have a one factor structure and high internal consistency (Tucak Junaković, 2011). A Cronbach-alpha coefficient of α = .9 was determined in a sample of this study.

Procedure

This research was carried out in Croatia between 19th March 2020 and 17th April 2020. The data in this study were obtained within the framework of larger research about aspects of adult mental health during the COVID-19 (coronavirus) pandemic. Before the research has been carried out, it was necessary to ensure that the research is in accordance with the relevant ethical standards. Therefore, it was applied for ethical approval and it was approved by the Ethics Committee of the Zagreb Child and Youth Protection Center. Research was carried out using structured online questionnaire, developed by using Google Forms, which included consent form. To recruit participants, snowball sampling method was used. Croatian citizens of 18 years and older were invited to participate in online study. The link which included questionnaire was sent through e-mails to the contacts of the researchers. The participants were encouraged to roll out the study to as many people as possible in order to forward it to people apart from the first point of contact and so on. Although the sample was convenient, researchers tried to include participants from various parts of Croatia by sending invitations to schools throughout Croatia with a request to forward the questionnaire to parents. Before taking the study, participants were presented with information about the study and provided informed consent. After that, if they had accepted to take the study, they provided their demographic information and afterwards answered a set of questions that appeared sequentially, page by page.

Results

Statistical analysis

All results were reported either as mean ± standard deviation or frequency (percentage) (%). Differences between the groups were tested by Welch's t-tests. Series of hierarchical regression analyses were performed to identify possible moderation effect of chronic diseases on the relationship between hope for the future and mental health variables used in this study. All statistical analyses were conducted in R Core Team (2020) and $p < ,05$ was considered to be statistically significant.

Results

There were 1482 participants in this study. Their sociodemographic characteristics are presented in Table 1, as means, frequencies and relative values. Most respondents were women (83.0%). The mean age of the sample was 33.3 years (*SD*=12.2), with household size of 3.8 members (*SD*=1.57). It should be noted that 35.0% of participants were married, 27.5% were in a relationship, 33.1% single and 4.4% divorced. In addition, 61.4% of participants reported having no children. The mean number of children reported by participants who had children was 2.03 (*SD*=1.03). Chronic health condition was reported by 13.8% respondents and 21.6% reported being in self-isolation as ordered by health authorities.

Table 1
Sociodemographic characteristics of the sample

		N	***M***	***SD***	**%**
Age			33.3	12.2	
Gender	Female	1230			83.0
	Male	252			17.0
Marital status	Married	520			35.0
	Divorced	65			4.4
	Single	476			33.1
	In a relationship	407			27.1
Children	No	910			61.3
	Yes	574			38.7
	Number of children		2.03	1.03	
Number of household members			3.8	1.57	
Chronic disease	No	1279			82.2
	Yes	205			13.8
Self-isolation	No	1169			78.4
	Yes	315			21.6

Note. N – number of participants, *M* – mean, *SD* – standard deviation, % - percent

A series of Welch's t-tests were conducted to examine differences between depression, anxiety and stress depending on chronic disease. It was found that there are significant differences in anxiety: $t(245{,}96) = 3.82$; $p < .001$ ($d = .34$), stress $t(263{,}93) = 2.32$; $p = .02$ ($d = .18$); and depression: $t(255{,}1) = 2.41$; $p = .02$ ($d = .20$). The obtained results show that people who have chronic illness have higher score than people who don't have chronic disease in all three cases, although the effect sizes are small.

To examine the moderation effect of chronic diseases on the relationship between hope for the future and mental health, a series of hierarchical regression analyses were conducted. In the first step of these analyses, the predictors were hope for the future and the existence of a chronic disease, while in the second step, their product was added as a predictor. Three such analyses were performed in total, with the criteria variables being anxiety (Table 2), depression (Table 3), and stress (Table 4).

Table 2
Summary of regression analysis with chronic disease, hope for the future and their product as predictors of anxiety as a criterion variable

	Anxiety				
	B	β	*SDB*	*t*	*p*
Chronic health condition	-0.84	-.53	0.2	-4.27	< .001
Hope for the future	-0.41	-.54	0.04	-9.2	< .001
Chronic health condition X Hope for the future	0.18	.5	0.05	3.62	< .001

Note. B – unstandardized regression coefficient, β – standardized regression coefficient, *SDB* – standard error of *B*, *t* – t-test value for significance testing of *B*, *p* – *p*-value of *t*.

Table 3
Summary of regression analysis with chronic disease, hope for the future and their product as predictors of depression as a criterion variable

	Depression				
	B	β	*SDB*	*t*	*p*
Chronic health condition	-0.53	-.27	0.22	-2.39	.02
Hope for the future	-0.56	-.61	0.05	-11.09	< .001
Chronic health condition X Hope for the future	0.12	.28	0.06	2.18	.03

Note. B – unstandardized regression coefficient, β – standardized regression coefficient, *SDB* – standard error of *B*, *t* – t-test value for significance testing of *B*, *p* – *p*-value of *t*.

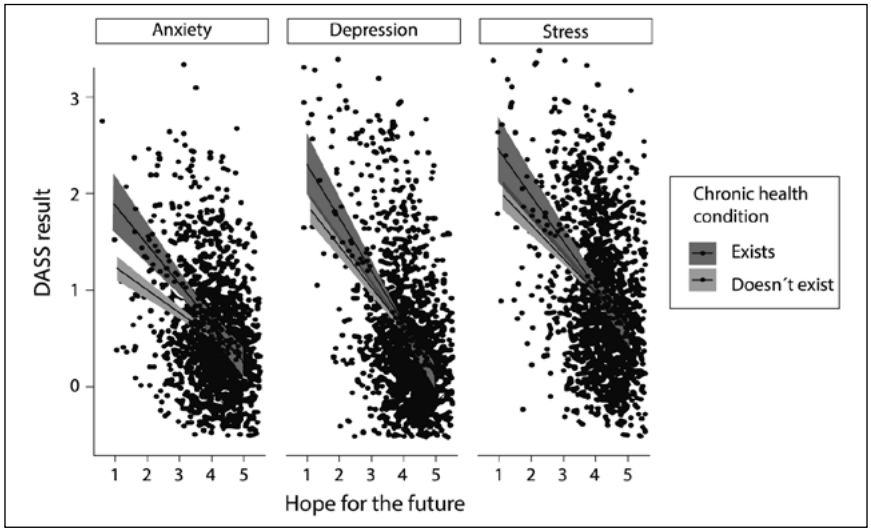
Table 4
Summary of regression analysis with chronic disease, hope for the future and their product as predictors of stress as a criterion variable

	Stress				
	B	β	*SDB*	*t*	*p*
Chronic health condition	-0.55	-.27	0.25	-2.19	.03
Hope for the future	-0.47	-.49	0.06	-8.31	< .001
Chronic health condition X Hope for the future	0.12	.27	0.06	1.96	.0497

Note. B – unstandardized regression coefficient, β – standardized regression coefficient, *SDB* – standard error of *B*, *t* – t-test value for significance testing of *B*, *p* – *p*-value of *t*.

It has been shown that chronic diseases have a significant moderation effect on the relationship between hope for the future and anxiety: $F(1, 1480) = 13.1$; $p < .001$; $\Delta R^2 =$, 01, depression: $F(1, 1480) = 3.86$; $p =$, 0497; $\Delta R^2 = .002$ and stress: $F(1, 1480) = 13.1$; $p < .001$; $\Delta R^2 = .002$. The correlation between hope for the future and mental health indicators is larger for people who have a chronic illness than for people who do not have a chronic illness. An overview of these relationships can be found in Figure 1.

Figure 1
Relationship of hope for the future with anxiety, depression, and stress depending on the existence of a chronic health condition



In order to more elaborately describe these differences in correlations depending on whether a person has a chronic illness or not, correlation coefficients were calculated between hope for the future and mental health indicators, separately in the group with chronic diseases and the group without. These correlations are found in Table 3. All correlations were negative and bigger in group of participants who have chronic health condition.

Discussion

Now, most global healthcare resources are directed on coronavirus disease which could disrupt the continuum of care for patients with chronic diseases and their mental health (Chudasama et al., 2020a; Chudasama et al., 2020b). Various studies (before the surge of pandemic) on this topic showed significant association between mental health and chronic diseases, such as cardiovascular, pulmonary and endocrinological (Rozario & Masho 2018, Mukeshimana & Chironda 2019). Research data from MERS outbreak suggests that individuals with history of chronic disease had increased odds for clinically significant anxiety (Jeong et al., 2016) and depression (Lee et al., 2018). Recent study found that 80% of healthcare professionals from 47 countries reported the mental health of their patients worsened during COVID-19 with diabetes, chronic obstructive pulmonary disease, and hypertension being the most impacted conditions due to reduction in access to care (Chudasama et al., 2020a).

Based on the aforementioned data, the first aim of this study was to examine the amounts of depression, anxiety, and stress during the COVID-19 pandemic between individuals who reported having a chronic disease and those who reported not having a chronic disease. In this study, participants who had chronic disease were shown to have higher levels of anxiety, depression, and stress compared to those who did not report having chronic disease. Possible explanations of these results stem from the fact that people with chronic disease are shown to have higher risk of a more serious clinical manifestations for COVID-19 (Zhang et al., 2020), they are generally more prone to mental health problems (Brooks et al., 2020), and at this time are exposed to a growing number of additional restrictions because of pandemic, all of which can negatively affect them, bringing anxiety, worries and fears, disrupting their mood and general assessment of threat in their lives, which could then lead to prolonged distress. Also, the mental health of individuals with chronic diseases is at the moment impacted by the fear of possible infection (Sayeed et al., 2020). Brooks et al. (2020) suggests that patients with chronic diseases will face mental health issues such as anxiety, depression, and increased stress during COVID-19 pandemic. The data from this research is consisted with late study from Spain which found that chronic disease patients had higher levels of stress, anxiety and depression compared to healthy individuals (Ozamiz-Etxebarria et al., 2020). On the other hand, recent study which investigated mental health in chronic disease patients during COVID-19 pandemic in Greece found that chronic disease patients had significantly higher levels of distress and somatization, but there were no significant differences found for anxiety and depression (Louvardi et al., 2020). Louvardi et al. (2020) suggest that no significant differences found in anxiety and depression between healthy individuals and those with chronic disease could possibly be explained by social support mechanisms that could have been activated during the current pandemic. In addition, authors state that patients with chronic diseases may have received higher support which had positive effects on depressive and anxiety levels, leading to absence of differences from healthy individuals.

Other aim of this study was to examine whether there is a moderating effect of chronic diseases on the relationship between hope for the future and anxiety, depression and stress. In previous research, hope for the future has been found to have a great part in adaptation to a challenging reality (Dixson et al., 2018; Lucas et al., 2020). In addition to that, hope can be considered a coping mechanism among chronic

patients (Soundy et al., 2016; Gallagher & Lopez, 2018) especially in current pandemic. Using hierarchical regression analysis, the degree to which the strength of the relationship between the existence of chronic disease and certain aspects of mental health is dependent on the hope for a better future was tested. As can be seen from the tabular displays, moderating effect of hope for the better future was observed in relation of chronic diseases and all measured aspects of mental health individually, depression, anxiety, and stress. All three interactions proved to be significant predictors of the criteria. Therefore, it can be concluded that negative correlation between hope for the future and mental health indicators used in this study is greater in participants who have a chronic disease, meaning that, when compared with healthy individuals, individuals with chronic diseases are more likely to be less hopeful for their future, which then leads to higher depression, anxiety and stress. Existing literature suggests that the maintenance or improvement of optimism and hope among people with chronic disease is associated with recovery from mental anguish and the preservation of resilience (Hou et al., 2010). Also, some authors found that hope is inversely correlated with stress and depression and associated with positive cardiovascular outcomes (Shepperd et al., 1996; Scheier et al., 1999; Warber et al., 2011). Other studies showed that hope contributed to increase life satisfaction or better health outcomes in patients diagnosed with kidney disease (Lopez-Vargas et al., 2014), musculoskeletal system disease (Kortte et al., 2010) and respiratory disease (Richman et al., 2005). Hartley et al. (2008) suggested that hopeful individuals believe that their current circumstances are temporary and can be transformed into better conditions.

Finally, epidemiological measures implemented to reduce the spread of the infection have a number of practical consequences for the health system, which operates to a somewhat limited extent in order to comply with the measures, which may be related to less accessible health care sources. These factors could be an increased source of excess worry and generally impaired mental health for people in this group, and therefore explain negative thoughts and expectations from what future brings (Ozamiz-Etxebarria et al., 2020). Furthermore, chronic disease is usually permanent health condition that requires an individual to adapt to a different lifestyle and certain limitations. Long-term nature of such diseases combined with health pandemic factors could be reasons people who have chronic diseases are less optimistic about future or have lower aspirations to preserve a fundamentally positive picture of life and the world as they predict it in the future.

Limitations of this study are mostly related to methodology, since convenient sample and snowball sampling method were used. Further limitation of our study is the over-representation of female participants. Also, as this study was conducted online, population of older people who do not possess electronic devices or internet access is underrepresented, as well as those with lower socioeconomic status (Bethlehem, 2010). That is a limiting factor because older people are subpopulation which has more chronic health conditions and is also described as vulnerable to COVID-19 complications. Future studies regarding this topic should take this into consideration. Also, it would be convenient for future research to study the importance of hope for future among different chronic diseases (Schiavon et al., 2017) during and after current health crisis. Due to the inability to reach the same participants it is not possible to conduct follow up studies which is a certain limitation to this study. It would thus be useful to conduct longitudinal research to monitor mental health indicators as pandemic changes with time. Since this research was conducted at the beginning of COVID-19 pandemic, it was important to get information about mental health indicators on time in order to be able to propose strategies and information that could be helpful, thus online research as a way of collecting relevant information was justified. Finally, this study contributes to the previous literature on mental health after the COVID-19 outbreak theoretically and practically, providing better understanding of vulnerabilities of people with chronic health conditions, thus emphasizing the vital importance for health care services in Croatia to provide the best possible health care during a pandemic for people with chronic health conditions, but also to prepare resources for possible rise in mental health problems in specific subpopulations in the long run.

Conclusions

These results indicate that people with chronic health diseases are more vulnerable for developing mental health consequences during this pandemic. Also, they indicate that, in addition to physical care, the chronically ill should also be provided with more mental health care resources. When making public health recommendations, proposing protocols and strategies, it is important to provide mental health support to those at high risk of developing difficulties in this area due to underlying comorbid difficulties and chronic diseases.

References

Asmundson, G. J., & Taylor, S. (2020). Coronaphobia: Fear and the 2019-nCoV outbreak. *Journal of Anxiety Disorders*, 70. https://doi.org/10.1016/j.janxdis.2020.102196

Bao, Y., Sun, Y., Meng, S., Shi, J., & Lu, L. (2020). 2019-nCoV epidemic: address mental health care to empower society. *The Lancet*, 395(10224), e37-e38. https://doi.org/10.1016/S0140-6736(20)30309-3

Bethlehem, J. (2010). Selection bias in web surveys. *International Statistical Review*, *78*(2), 161-188. https://doi.org/10.1111/j.1751-5823.2010.00112.x

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. *The Lancet*. https://doi.org/10.1016/S0140-6736(20)30460-8

Chudasama, Y. V., Gillies, C. L., Zaccardi, F., Coles, B., Davies, M. J., Seidu, S., & Khunti, K. (2020a). Impact of COVID-19 on routine care for chronic diseases: a global survey of views from healthcare professionals. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, *14*(5), 965-967. https://doi.org/10.1016/j.dsx.2020.06.042

Chudasama, Y. V., Zaccardi, F., Gillies, C. L., Dhalwani, N. N., Yates, T., Rowlands, A. V., ... & Khunti, K. (2020b). Leisure-time physical activity and life expectancy in people with cardiometabolic multimorbidity and depression. *Journal of Internal Medicine*, *287*(1), 87-99. https://doi.org/10.1111/joim.12987

Dixson, D. D., Keltner, D., Worrell, F. C., & Mello, Z. (2018). The magic of hope: Hope mediates the relationship between socioeconomic status and academic achievement. *The Journal of Educational Research*, *111*(4), 507-515. https://doi.org/10.1080/00220671.2017.1302915

Dutheil, F., Mondillon, L., & Navel, V. (2020). PTSD as the second tsunami of the SARS-Cov-2 pandemic. *Psychological Medicine*, 1-2. https://doi.org/10.1017/S0033291720001336

Erikson, E. (1984.), *Childhood and Society*. Triad Paladin.

Gallagher, M. W., & Lopez, S. J. (2018). *The Oxford handbook of hope*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199399314.001.0001

Hartley, S. M., Vance, D. E., Elliott, T. R., Cuckler, J. M., & Berry, J. W. (2008). Hope, self-efficacy, and functional recovery after knee and hip replacement surgery. *Rehabilitation Psychology*, *53*(4), 521. https://doi.org/10.1037/a0013121

Hou, W. K., Law, C. C., Yin, J., & Fu, Y. T. (2010). Resource loss, resource gain, and psychological resilience and dysfunction following cancer diagnosis: a growth mixture modeling approach. *Health Psychology*, *29*(5), 484. https://doi.org/10.1037/a0020809

Jeong, H., Yim, H. W., Song, Y. J., Ki, M., Min, J. A., Cho, J., & Chae, J. H. (2016). Mental health status of people isolated due to Middle East Respiratory Syndrome. *Epidemiology and health*, *38*. https://doi.org/10.4178/epih.e2016048

Kang, L., Li, Y., Hu, S., Chen, M., Yang, C., Yang, B. X., ... & Liu, Z. (2020). The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *The Lancet Psychiatry*, 7(3), e14. https://doi.org/10.1016/S2215-0366(20)30047-X

Kortte, K. B., Gilbert, M., Gorman, P., & Wegener, S. T. (2010). Positive psychological variables in the prediction of life satisfaction after spinal cord injury. *Rehabilitation Psychology*, *55*(1), 40. https://doi.org/10.1037/a0018624

Lauri Korajlija A., & Jokić-Begić N. (2020). COVID-19: Concerns and behaviours in Croatia [preprint]. *British Journal of Health Psychology*. https://doi.org/10.1111/bjhp.12425

Lee, S. M., Kang, W. S., Cho, A. R., Kim, T., & Park, J. K. (2018). Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. *Comprehensive Psychiatry*, *87*, 123-127. https://doi.org/10.1016/j.comppsych.2018.10.003

Lopez-Vargas, P. A., Tong, A., Phoon, R. K., Chadban, S. J., Shen, Y., & Craig, J. C. (2014). Knowledge deficit of patients with stage 1–4 CKD: a focus group study. *Nephrology*, *19*(4), 234-243. https://doi.org/10.1111/nep.12206

Louvardi, M., Pelekasis, P., Chrousos, G. P., & Darviri, C. (2020). Mental health in chronic disease patients during the COVID-19 quarantine in Greece. *Palliative & Supportive Care*, *18*(4), 394-399. https://doi.org/10.1017/S1478951520000528

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, *33*(3), 335-343.

Lucas, A. G., Chang, E. C., Li, M., Chang, O. D., Yu, E. A., & Hirsch, J. K. (2020). Trauma and suicide risk in college students: does lack of agency, lack of pathways, or both add to further risk? *Social Work*, *65*(2), 105-113. https://doi.org/10.1093/sw/swaa007

Mahase, E. (2020). China coronavirus: WHO declares international emergency as death toll exceeds 200. *BMJ: British Medical Journal*, *368*. https://doi.org/10.1136/bmj.m408

McAdams, D. P., Hart, H. M., & Maruna, S. (1998.), The Anatomy of Generativity. In D. P. McAdams & E. de St. Aubin (Eds.), *Generativity and Adult Development: How and Why We Care for the Next Generation* (str. 7-43), Washington, D.C., APPA Press.

Mowbray, H. (2020). In Beijing, coronavirus 2019-nCoV has created a siege mentality. *British Medical Journal*, *368*. https://doi.org/10.1136/bmj.m516

Mukeshimana, M., & Chironda, G. (2019). Depression and Associated Factors Among the Patients with Type 2 Diabetes in Rwanda. *Ethiopian Journal of Health Sciences*, *29*(6). https://doi.org/10.4314/ejhs.v29i6.7

Onder, G., Rezza, G., & Brusaferro, S. (2020). Case-fatality rate and characteristics of patients dying in relation to COVID-19 in Italy. *Jama*, *323*(18), 1775–1776. https://doi.org/10.1001/jama.2020.4683

Ozamiz-Etxebarria, N., Dosil-Santamaria, M., Picaza-Gorrochategui, M., & Idoiaga-Mondragon, N. (2020). Stress, anxiety, and depression levels in the initial stage of the COVID-19 outbreak in a population sample in the northern Spain. *Cadernos de Saude Publica*, *36*(4), e00054020. https://doi.org/10.1590/0102-311X00054020

Pellino, G., & Spinelli, A. (2020). How Coronavirus Disease 2019 Outbreak Is Impacting Colorectal Cancer Patients in Italy: A Long Shadow Beyond Infection. *Diseases of the Colon & Rectum*, 63(6), 720–722. https://doi.org/10.1097/DCR.0000000000001685

R Core Team (2020). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/.

Reić Ercegovac I. & Penezić Z. (2012) Adaptirana skala depresivnosti, anskioznosti i stresa. In A. Proroković, V. Ćubela Adorić, Z. Penezić, I. Tucak Junaković (Eds). *Zbirka psihologijskih skala i upitnika, svezak 6*,

Zadar: Filozofski fakultet u Zadru, 17-24.

Richman, L. S., Kubzansky, L., Maselko, J., Kawachi, I., Choo, P., & Bauer, M. (2005). Positive emotion and health: going beyond the negative. *Health Psychology*, *24*(4), 422. https://doi.org/10.1037/0278-6133.24.4.422

Rozario, S. S., & Masho, S. W. (2018). The associations between mental health status, hypertension, and hospital inpatient visits in women in the United States. *American Journal of Hypertension*, *31*(7), 804-810. https://doi.org/10.1093/ajh/hpy065

Ruan, Q., Yang, K., Wang, W., Jiang, L., & Song, J. (2020). Clinical predictors of mortality due to COVID-19 based on an analysis of data of 150 patients from Wuhan, China. *Intensive Care Medicine*, 1–3. https://doi.org/10.1007/s00134-020-05991-x

Sayeed, A., Kundu, S., Al Banna, M. H., Christopher, E., Hasan, M. T., Begum, M. R., ... & Khan, M. S. I. (2020). Mental health outcomes of adults with comorbidity and chronic diseases during the COVID-19 pandemic: a matched case-control study. *Psychiatria Danubina*, 32(3-4), 491-498. https://doi.org/10.24869/psyd.2020.491

Scheier, M. F., Matthews, K. A., Owens, J. F., Schulz, R., Bridges, M. W., Magovern, G. J., & Carver, C. S. (1999). Optimism and rehospitalization after coronary artery bypass graft surgery. *Archives of Internal Medicine*, *159*(8), 829-835. https://doi.org/10.1001/archinte.159.8.829

Scheier, M. F., Matthews, K. A., Owens, J. F., Schulz, R., Bridges, M. W., Magovern, G. J., & Carver, C. S. (1999). Optimism and rehospitalization after coronary artery bypass graft surgery. *Archives of Internal Medicine*, *159*(8), 829-835. https://doi.org/10.1001/archinte.159.8.829

Schiavon, C. C., Marchetti, E., Gurgel, L. G., Busnello, F. M., & Reppold, C. T. (2017). Optimism and hope in chronic disease: a systematic review. *Frontiers in Psychology*, *7*, 2022. https://doi.org/10.3389/fpsyg.2016.02022

Shepperd, J. A., Maroto, J. J., & Pbert, L. A. (1996). Dispositional optimism as a predictor of health changes among cardiac patients. *Journal of Research in Personality*, *30*(4), 517-534. https://doi.org/10.1006/jrpe.1996.0038

Shepperd, J. A., Maroto, J. J., & Pbert, L. A. (1996). Dispositional optimism as a predictor of health changes among cardiac patients. *Journal of Research in Personality*, *30*(4), 517-534. https://doi.org/10.1006/jrpe.1996.0038

Shigemura, J., Ursano, R. J., Morganstein, J. C., Kurosawa, M., & Benedek, D. M. (2020). Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. *Psychiatry and Clinical Neurosciences*, *74*(4), 281. https://doi.org/10.1111/pcn.12988

Soundy, A., Roskell, C., Elder, T., Collett, J., & Dawes, H. (2016). The psychological processes of adaptation and hope in patients with multiple sclerosis: a thematic synthesis. *Open Journal of Therapy and Rehabilitation*, *4*(1), 22-47. https://doi.org/10.4236/ojtr.2016.41003

Tucak Junaković, I. (2010). Skala nade u budućnost. In I. Tucak Junaković, V. Ćubela Adorić, Z. Penezić, A. Proroković (Eds). *Zbirka psihologijskih skala i upitnika: svezak 5*, Zadar: Filozofski fakultet u Zadru, 112-119.

Tucak Junaković, I. (2011). Neki aspekti brige odraslih za mlađe generacije: spolne i dobne razlike. *Društvena istraživanja*, *20*(113), 671-692.

Warber, S. L., Ingerman, S., Moura, V. L., Wunder, J., Northrop, A., Gillespie, B. W., ... & Rubenfire, M. (2011). Healing the heart: a randomized pilot study of a spiritual retreat for depression in acute coronary syndrome patients. *Explore*, *7*(4), 222-233. https://doi.org/10.1016/j.explore.2011.04.002

World Health Organisation (WHO). Coronavirus disease (COVID-19) outbreak. https://experience.arcgis.com/experience/685d0ace521648f8a5beeeee1b9125cd

Yang, J., Zheng, Y., Gou, X., Pu, K., Chen, Z., Guo, Q., Ji, R., Wang, H., Wang, Y., & Zhou, Y. (2020). Prevalence

of comorbidities and its effects in patients infected with SARS-CoV-2: a systematic review and meta-analysis. *International Journal of Infectious Diseases*, 94, 91–95. https://doi.org/10.1016/j.ijid.2020.03.017

Zandifar, A., & Badrfam, R. (2020). Iranian mental health during the COVID-19 epidemic. *Asian Journal of Psychiatry*, *51*. https://doi.org/10.1016/j.ajp.2020.101990

Zhang, J., Wang, X., Jia, X., Li, J., Hu, K., Chen, G., Wei, J., Gong, Z., Zhou, C., Yu, H., Yu, M., Lei, H., Cheng, F., Zhang, B., Xu, Y, Wang, G., & Dong, W. (2020). Risk factors for disease severity, unimprovement, and mortality of COVID-19 patients in Wuhan, China. *Clinical Microbiology and Infection*. https://doi.org/10.1016/j.cmi.2020.04.012