Psychiatria Danubina, 2024; Vol. 36, No. 1, pp 83-93 https://doi.org/10.24869/psyd.2024.83 *Original research*

BURNOUT SYMPTOMS AND PSYCHOLOGICAL WELL-BEING AMONG CROATIAN HOSPITAL FRONTLINE NURSES AND PHYSICIANS DURING THE COVID-19 PANDEMIC: THE CONTRIBUTION OF ENVIRONMENTAL AND PERSONAL CHARACTERISTICS

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received: 30. 01. 2022.; revised: 3. 01. 2023.; accepted: 21. 10. 2023.

Summary

Background: *Direct contact with COVID-19 patients affect the mental health of frontline healthcare professionals. The main goal of this study was to investigate the levels of burnout and psychological symptoms (posttraumatic symptoms-PTSS, depression, anxiety, and stress-DASS) as well as life satisfaction among nurses and physicians working at University Hospital Dubrava, Zagreb (impacted by the earthquakes) and University Hospital of Split. The second goal was to examine the contribution of gender and personality traits to the levels of psychological symptoms among all participants.*

Subjects and Methods: *A set of questionnaires measuring psychological symptoms and personal characteristics was sent via the Google form platform to healthcare professionals and in total 227 completed the form (138 nurses and 89 physicians). The sample consisted of 180 (79.3% females) and 47 (20.7% males). Among the respondents, 75 nurses and 64 physicians were employees of University Hospital Dubrava of 63 nurses and 25 physicians were employees in the University Hospital of Split.*

Results: *The results showed that physicians in general scored higher on the burnout scale ($p<0.001$) while nurses reported higher anxiety ($p=0.011$). Nurses working in Zagreb had higher levels of burnout ($p<0.001$), more depressive ($p=0.009$) and anxiety ($p=0.027$) symptoms as well as experienced more stress ($p=0.007$), and less life satisfaction ($p=0.007$) than nurses working in Split. Differences in psychological symptoms and resilience in physicians working in Split and Zagreb were not established. Regression analyses showed that the female gender predicted more PTSS, ($B=-4.77$, $p=0.045$) while the physician profession predicted higher burnout symptoms ($B=2.67$, $p=0.002$). Considering personality traits, higher emotional stability and resilience predicted lower PTSS and DASS symptoms. Traits extraversion ($B=0.17$, $p=0.003$), conscientiousness ($B=0.26$, $p<0.001$) and resilience ($B=1.21$, $p=0.024$) predicted more life satisfaction. Traits of agreeableness ($B=-0.21$, $p= 0.001$) and emotional stability ($B=-0.45$, $p<0.001$) predicted a decrease in the intensity of the burnout.*

Conclusions: *This study recognized the importance of personality traits as protective factors contributing to psychological well-being in frontline hospital healthcare workers during the COVID-19 pandemic. On the contrary, exposure to multiple traumas and belonging to a profession of physician emerges as risk factors contributing to more psychological symptoms.*

Keywords: *COVID-19 –burnout – psychological symptoms – personality traits – healthcare*

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INTRODUCTION

The concept of burnout syndrome was first discussed in the 1970s while studying the distress connected to the work environment (Freudenberger, 1974). Burnout syndrome is classified as an *occupational phenomenon* considered to be the result of chronic stress at work, with the use of relatively ineffective coping strategies (Kakiashvili et al. 2013). The symptoms include emotional exhaustion, depression, and insecurity in the field of professional competencies that are related to the daily negative tension in a difficult and stressful work environment (Schaufeli et al. 2009).

The prevalence of burnout syndrome among healthcare professionals is high, with the summary estimate being 40% (O'Connor et al. 2018). Considering that the COVID-19 pandemic has already drastically changed the very challenging work environment in healthcare, exposing healthcare professionals to additional stressors and psychological pressure, increases the chance of developing psychiatric morbidities (Batra et al. 2020). Studies indisputably show that exposed healthcare professionals experience higher levels of stress, anxiety, and depression symptoms during the COVID-19 pandemic, which could have long-term psychological implications (Carmassi et al. 2020, Lu et al. 2020, Tan et al. 2020, Zhang

et al. 2020, Franza et al. 2020), specifically if they have been in close contact with infected patients (Lai et al. 2020). Life satisfaction was also shown to be jeopardized in healthcare professionals in which the satisfaction with life was much lower in those working with COVID-19 positive patients than in those who were not (Teke et al. 2021). Furthermore, a meta-analysis showed that not only the prevalence of anxiety, depression, stress, and lower life satisfaction extremely high for healthcare professionals during the pandemic, but also insomnia and PTSD (Marvaldi et al. 2021). More so, the pooled prevalence of burnout during the pandemic was 37.4% (Batra et al. 2020) which could potentially lead to a major mental health crisis worldwide and increased suicide rates among healthcare professionals (Chirico & Magnavita, 2020, Leslie Kane, 2021). A higher prevalence of almost all mental health symptoms (depression, anxiety, stress, insomnia) and PTSD was found among women and nurses, as opposed to men and physicians (Luceño-Moreno et al. 2020; Zhang et al. 2020). More so, the rates of burnout and mental health symptoms are shown to be higher in younger healthcare professionals with fewer years of experience (Wang et al. 2020). Some studies even found differences between doctor specialties and COVID anxiety scores (Jokić-Begić et al. 2020).

Studies conducted during pandemics, including the COVID-19 pandemic, also suggest that personality traits and coping strategies of healthcare professionals are important determinants for the development of mental health issues (Marjanovic et al. 2007; Gupta & Sahoo, 2020). Each of the specific dimensions of personality according to the Big Five-factor model has a significant and different impact on burnout syndrome (Zellars et al. 2000; Alarcon et al. 2009). For example, while emotional stability and agreeableness show an association with resilience to stress exposures, extraversion and openness oppose these protective factors (Coco et al. 2021). Furthermore, maladaptive coping (Phua et al. 2005; Maunder et al. 2006), as well as avoidant coping mechanisms (Maunder, 2004) and neuroticism (Lu et al. 2006) were found to be risk factors for experiencing burnout syndrome and developing more severe mental health symptoms, while strong self-efficacy served as an indicator of resilience and a protective factor (Preti et al. 2020).

The mental health of healthcare professionals is of particular interest in times of pandemic, and to date, it is widely known that a person's emotional and psychological well-being is fundamental for the full use of cognitive and emotional capacities and for carrying out one's function in society. More so, in the Republic of Croatia, during the peak of the first wave of the pandemic, Zagreb was exposed to several strong earthquakes that damaged many buildings and caused a strong disturbance and suffering among the population, from which neither patients nor hospital healthcare professionals were exempted. Another earthquake hit the central Croatia in December 2020 near Petrinja. The city of Zagreb which is roughly 50 km to the north of the epicenter, was affected with some building damage, power outages, and many residents taking to the streets in distress. Along with exposure to pandemic-related stressors, the healthcare professionals were further traumatized which could have affected their already impaired psychological well-being. Therefore, by investigating the role of risk and resilience factors of the pandemic in the psychological well-being of healthcare professionals, a better insight into the mechanisms of psychological stress, as well as the potential ones, would contribute to improving the therapeutic ways of coping with stress and other important risk factors.

Accordingly, in this research, we were primarily interested to investigate and compare the levels of psychological well-being (burnout, posttraumatic symptoms, symptoms of depression, anxiety, and stress as well as life satisfaction) between hospital frontline nurses and physicians working at the University Hospital Dubrava, Zagreb (impacted by the earthquakes and pandemic) and University Hospital of Split (affected by pandemic) during the COVID-19 pandemic and among nurses and physicians working in those two cities separately. We also examined the role of gender and personality traits contributing to the levels of psychological wellbeing (PTS symptoms, life satisfaction, burnout symptoms as well as symptoms of depression, anxiety, and stress) in Croatian frontline healthcare professionals (nurses and physicians). Based on previous research on COVID-19 and mental health (Carmassi et al. 2020; Lu et al. 2020; Tan et al. 2020; Zhang et al. 2020, Franza et al. 2020), we hypothesized that personality traits could play an important role as protective factors contributing to psychological well-being in frontline hospital healthcare workers during COVID -19 pandemic.

SUBJECTS AND METHODS

Participants and Procedure

For the purposes of the research, a set of questionnaires were used among 227 subjects, of which 138 (60.8%) were nurses and 89 (39.2%) were physicians. Among the respondents, a total of 63 nurses were employees at the University Hospital of Split and 75 at the University Hospital Dubrava in Zagreb, while among doctors 25 were employed at the University Hospital

of Split and 64 at the University Hospital Dubrava. The sample consisted of 180 (79.3%) females and 47 (20.7%) males with a mean age of 37.86.

The research was conducted online, between January and March 2021, via the Google form platform during the course "Burnout in healthcare professionals during the COVID-19 pandemic" organized by the University Hospital Dubrava and the University Department of Health Studies of the University of Split. The research was anonymous and voluntary, and the subjects confirmed their consent to participate in the research by pressing the "Accept" button after reading the instructions. Only fully completed questionnaires were used for further analyses in such a way that subjects had to press the "Submit" button after completing the questionnaires. This automatically converted their results to an Excel spreadsheet. This study was approved by the ethics committees of University Hospital Dubrava (2021/2901-03) and the University Department of Health Studies of the University of Split (0001-31/21-01/31).

Measures

The Workplace Burnout Intensity Questionnaire (Ajduković & Ajduković, 1996) measures the intensity of the various symptoms associated with professional burnout syndrome. The questionnaire contains 18 statements examining cognitive (e.g., *I notice that I think negatively about the job, and I focus only on its bad sides*), behavioral (e.g., *I spend more time avoiding work rather than working*), and emotional (e.g., *I am more irritable than befo*re) signs of the burnout syndrome. On a scale of 1 to 3, participants assessed attendance of a particular symptom, wherein 1 indicated the symptom was experienced "rarely", 2 "sometimes", and 3 "always". The total score ranges from 18 to 54 and it is expressed as the sum of all answers. The severity of burnout is categorized into three groups: the scores ranging from18 to 25 belong to the category "without signs of burnout", the scores ranging from 26 to 33 indicate "initial burnout", and the scores ranging from 34 to 54 are classified as "severe burnout signs". For validation purposes, Ljubotina and Družić (1996) first applied this questionnaire with an internal reliability score index of 0.89.

The Croatian translation of the *International Personality Item Pool (IPIP;* Mlačić & Goldberg, 2007) was used to measure the Big-Five domains (Goldberg 1999) with 50 items (short form). Participants were asked to read each of the 50 items and then rate how well they believe it described them on a 5-point Likert-type scale ranging from 1 (very inaccurate) to 5 (very accurate) as in the original instrument (Goldberg, 1999). Previous research confirmed the stability of the five-factor structure of IPIP-50 and satisfactory scale reliability on a sample of Croatian adolescents (Mlačić et al. 2007). The IPIP-50 consists of 10 statements for each of the five factors of the Big-Five model: Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Intellect. High results on Extraversion point the pronounced engagement with other people and with the external world. Agreeableness reflects individual differences in peoples' interest in the needs and well-being of others, therefore high agreeableness is marked by altruism, caring, and emotional support. Conscientiousness reflects how we control, regulate, and direct our impulses, and high conscientiousness points to a reliable, well-organized, responsible, and hard-working person. High emotional stability indicates calm, composed, and relaxed individuals who do not react with intense emotions. High results on the Intellect dimension point to an imaginative person who enjoys variety, novelty, and change, and who has intellectual and artistic interests.

Depression Anxiety Stress-Scale (*DASS*; Lovibond & Lovibond 1995; Croatian translation; Sušac et al. 2018) predominantly assesses the perceived severity of symptoms related to depression, anxiety, and stress. DASS-21, used in this study, is the shortened version of the original scale. In the DASS-21 the respondents are asked to think about their experiences in the past seven days and to judge how each statement applied to them. There are 21 items in this scale with four response options: 0 "Did not apply to me at all–Never", 1 "Applied to me to some degree, or some of the time–Sometimes", 2 "Applied to me to a considerable degree, or a good part of the time–Often" to 3 "Applied to me very much, or most of the time–Almost always". Scores on three subscales named DASS-21-Depression (DASS-21-D), DASS-21-Anxiety (DASS-21-A), and Stress (DASS-21-S) can then be calculated. There are seven items in each of the subscales; the score of which ranges from 0 to 21. The result can also be shown as the total score of the responses on the entire scale ranging from 0 to 63. This study used a validated Croatian scale that confirmed the three-factor structure of the original questionnaire where the reliability of the original subscales ranges from 0.77 to 0.89, which is in line with the results obtained in the research of the authors of the scale (Sušac et al. 2018).

Brief Resilience Scale (BRS; Smith et al. 2008; adapted and translated version in Croatian; Slišković & Burić, 2018) measures the ability to bounce back and recover from stress. The scale contains six items (e.g., *It does not take me long to recover from a stressful event*). The answers are scored on a 5-point Likert-scale ranging from 1 "Strongly disagree" to 5 "Strongly agree". Three items

were formulated negatively (e.g., *I tend to take a long time to get over setbacks in my life*). The total scores are the mean scores of all answers ranging from one to five in which the higher scores indicate a better-developed ability of resilience. The original BRS was tested in different samples on its psychometric quality (Smith et al. 2008). Factor analysis showed that the BRS is unidimensional and 55-67% of the variance could be explained by this factor. Cronbach's alpha of the factor was between 0.80 and 0.91 and test-retest reliability was 0.69 for one month, 0.62 for three months. Validity was tested in different ways and confirmed.

Post-traumatic Stress Disorder Checklist: Civilian Scale (*PCL-5*; Weathers et al. 2013; translated in Croatian; Antičević et al. 2021) is a 20-item, self-report measure that assesses PTSS based on the PTSD criteria in the *DSM-5*. The measure is used for a variety of purposes, including monitoring symptom change during and after treatment. Respondents rate each item using a scale of 0 (not at all) to 4 (extremely). The PCL-5 yields a total symptom severity score (range: 0–80), which can be obtained by summing the scores for each of the 20 items. Initial research suggested a PCL-5 cut-off score between 31 and 33 is indicative of probable PTSD across samples (Blevins et al. 2015). In line with recommendations made by Sun et al. (2020), a score of 33 or higher indicates a high level of PTSS. The previous studies indicated that the PCL-5 demonstrates good psychometric properties and reliability in the Croatian sample (Cronbach's alpha = 0.95).

Satisfaction with Life Scale (*SWLS*; Diener et al. 1985; translated in Croatian; Drmić, 2020) measures global satisfaction with one's life. The scale consists of 5 items asking participants about the degree of agreement on each item. A 7-point Likert scale is used where 7 means "Strongly agree" and 1 means "I do not agree at all." According to Pavot and Diener (1993), Cronbach's alpha coefficient of internal consistency was 0.87, while reliability measured using test-retest method was 0.82.

Statistical analyses

Average values were presented by arithmetic mean and standard deviation, while the normality of the distribution was previously examined by the Kolmogorov-Smirnov test. Differences between the observed groups were examined by t-test. The contribution of the personal and psychological characteristics to the severity of burnout as well as to the levels of life satisfaction of healthcare professionals was examined by multiple logistic regression, using a stepwise variable selection procedure.

RESULTS

As can be seen from Table 1 physicians generally scored significantly higher on the burnout scale compared to nurses while nurses reported higher levels of anxiety, measured by DASS. Scores on the burnout questionnaire in both groups indicated the initial level of professional burnout.

The results in Table 2 showed that nurses working at University Hospital Dubrava Zagreb had higher levels of burnout, more depressive and anxiety symptoms as well as experienced more stress than nurses working at the University Hospital of Split. Accordingly, they had lower life satisfaction in comparison with their colleagues working in Split.

Differences in psychological symptoms and resilience in physicians working at University Hospital Split and University Hospital Dubrava Zagreb during the first wave of the pandemic were not established (Table 3).

In order to identify the role of sociodemographic and personal factors contributing to the levels of psychopathological symptoms (PTS symptoms, life satisfaction, burnout symptoms as well as symptoms of depression, anxiety, and stress) in Croatian frontline healthcare professionals (nurses and physicians) four logistic regression analysis

Table 1 Differences in psychological symptoms and resilience between nurses and physicians

	Nurses			Physicians				
	n	**Mean**	**SD**	**n**	**Mean**	**SD**	**t**	**p**
Burnout questionnaire	138	27.14	7.35	89	31.87	8.36	4.47	<0.001**
PTS symptoms	138	43.10	17.07	89	43.15	16.06	0.02	0.984
Life satisfaction	138	25.66	6.04	89	24.07	6.34	1.90	0.059
Depression	138	6.31	5.55	89	7.21	5.75	1.18	0.240
Anxiety	138	6.01	5.28	89	4.31	4.19	2.56	0.011*
Stress	138	7.86	5.44	89	9.48	5.31	2.21	0.028
Resilience scale	138	3.18	0.82	89	3.15	0.94	0.26	0.792

Table 2 Differences in psychological symptoms and resilience in nurses working at University Hospital of Split and University Hospital Dubrava, Zagreb

	Nurses							
	Split			Zagreb			t	p
	n	Mean	SD	n	Mean	SD		
Burnout questionnaire	63	24.84	5.93	75	29.08	7.89	3.51	0.001**
PTS symptoms	63	40.97	16.10	75	44.89	17.75	1.35	0.179
Life satisfaction	63	27.16	4.95	75	24.40	6.60	2.73	0.007**
Depression	63	4.98	4.82	75	7.43	5.89	2.63	0.009**
Anxiety	63	4.94	4.95	75	6.92	5.41	2.23	0.027**
Stress	63	6.51	4.88	75	9.00	5.65	2.74	0.007**
Resilience scale	63	3.29	0.85	75	3.09	0.80	1.43	0.155

Table 3. Differences in psychological symptoms and resilience in physicians working at Clinical Hospital of Split and University Hospital Dubrava Zagreb

	Physicians							
	Split			Zagreb			t	p
	n	Mean	SD	n	Mean	SD		
Burnout questionnaire	25	31.28	8.74	64	32.09	8.26	-0.41	0.682
PTS symptoms	25	43.24	17.16	64	43.11	15.75	0.03	0.973
Life satisfaction	25	23.92	5.70	64	24.13	6.61	-0.14	0.892
Depression	25	6.80	5.80	64	7.38	5.77	-0.42	0.674
Anxiety	25	4.04	2.49	64	4.42	4.70	-0.38	0.701
Stress	25	8.68	4.77	64	9.80	5.51	-0.89	0.375
Resilience scale	25	3.16	0.95	64	3.15	0.94	0.04	0.968

Table 4. Predictors of PTS symptoms in frontline healthcare professionals during COVID-19 pandemic

Model	Unstandardized Coefficients		Standardized Coefficients	t	p	Collinearity Statistics	
	B	Standard Error	Beta coefficient			Tolerance	VIF
(Constant)	81.29	7.03		11.57	**<0.001**		
City (1=Zagreb. 2=Split)	0.08	1.84	0.00	0.04	0.967	0.88	1.143
Gender (1=male. 2=female)	-4.77	2.37	-0.12	-2.01	**0.045**	0.76	1.315
Age (in years)	0.11	0.09	0.06	1.15	0.251	0.92	1.085
Profession (1=physician. 2=nurse)	-1.39	1.92	-0.04	-0.72	0.471	0.80	1.252
Extroversion	0.27	0.14	0.12	1.88	0.061	0.63	1.583

were conducted. Demographic factors (city of work and gender) and personal factors (personality traits and resilience) were used as predictors, while average scores on PCL-5 (Table 4), life satisfaction (Table 5), burnout (Table 6), and DASS (Table 7) scales were used as a criterion.

According to the estimated model (R^2=45.2%; F=17.78, p<.001) in Table 4, gender had a statistically significant effect on PTS symptoms indicating higher levels of symptoms in females compared to males (B=-4.77, p=0.045). Also, there was a negative and significant effect of emotional stability (B=-0.69, p<0.001) as well as resilience (B=-6.94, p<0.001) on PTS scores where higher emotional stability and resilience to stressors predicted lower levels of PTS symptoms in frontline healthcare professionals.

The statistically significant model (R^2=37.2%; F=12.81; p<0.001) in Table 5 showed that both extraversion (B=0.17, p=0.003) and conscientiousness (B=0.26, p<0.001) as well as resilience (B=1.21, p=0.024) have a

Table 5. Predictors of life satisfaction in frontline hospital workers during COVID-19 pandemic

Model	Unstandardized Coefficients		Standardized Coefficients	t	p	Collinearity Statistics	
	B	Standard Error	Beta coefficient			Tolerance	B
(Constant)	8.40	2.80		3.00	**0.003**		
City (1=Zagreb. 2=Split)	-0.31	0.73	-0.02	-0.42	0.672	0.88	1.143
Gender (1=male. 2=female)	1.28	0.94	0.08	1.36	0.175	0.76	1.315
Age (in years)	-0.02	0.04	-0.04	-0.62	0.539	0.92	1.085
Profession (1=physicians. 2=nurses)	-0.65	0.76	-0.05	-0.85	0.394	0.80	1.252
Extroversion	0.17	0.06	0.20	3.01	**0.003**	0.63	1.583
Agreeableness	-0.02	0.07	-0.02	-0.30	0.767	0.58	1.737
Conscientiousness	0.26	0.07	0.28	4.00	**<0.001**	0.60	1.661
Emotional stability	0.10	0.05	0.15	1.90	0.059	0.48	2.075
Intellect	0.03	0.07	0.03	0.44	0.660	0.65	1.549
Resilience scale	1.21	0.53	0.17	2.28	**0.024**	0.53	1.906

Dependent Variable: Life satisfaction

Table 6. Predictors of burnout levels in frontline hospital workers during COVID-19 pandemic

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	Standard Error	Beta coefficient	Standard Error			Tolerance	VIF
(Constant)	49.10	3.05		16.12	**<0.001**		
City (1=Zagreb. 2=Split)	1.15	0.80	0.07	1.45	0.149	0.88	1.143
Gender (1=male. 2=female)	0.67	1.03	0.03	0.65	0.516	0.76	1.315
Age (in years)	-0.00	0.04	-0.00	-0.04	0.971	0.92	1.085
Profession (1=physicians. 2=nurses)	2.67	0.83	0.16	3.21	**0.002**	0.80	1.252
Extroversion	-0.10	0.06	-0.09	-1.65	0.101	0.63	1.583
Agreeableness	-0.21	0.08	-0.15	-2.56	**0.011**	0.58	1.737
Conscientiousness	-0.01	0.07	-0.01	-0.14	0.888	0.60	1.661
Emotional stability	-0.45	0.06	-0.49	-7.58	**<0.001**	0.48	2.075
Intellect	0.03	0.08	0.02	0.32	0.753	0.65	1.549
Resilience scale	-1.13	0.58	-0.12	-1.95	0.052	0.53	1.906

a. Dependent Variable: Burnout levels

Table 7. Predictors of depression, anxiety and stress in frontline healthcare professionals during COVID-19 pandemic

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	Standard Error	Beta coefficient	Standard Error			Tolerance	VIF
(Constant)	53.22	5.69		9.36	**<.001**		
City (1=Zagreb. 2=Split)	2.38	1.49	0.08	1.60	0.111	0.89	1.143
Gender (1=male. 2=female)	-0.95	1.92	-0.03	-0.49	0.622	0.76	1.315
Age (in years)	-0.01	0.08	-0.01	-0.17	0.868	0.92	1.085
Profession (1=physicians. 2=nurses)	-3.01	1.55	-0.10	-1.94	0.054	0.80	1.252
Extroversion	-0.11	0.11	-0.06	-0.99	0.325	0.63	1.583
Agreeableness	-0.08	0.15	-0.03	-0.55	0.584	0.58	1.737
Conscientiousness	-0.02	0.13	-0.01	-0.14	0.892	0.60	1.661
Emotional stability	-1.00	0.11	-0.60	-9.05	**<0.001**	0.48	2.075
Intellect	0.15	0.15	0.06	1.00	0.319	0.65	1.549
Resilience scale	-2.41	1.08	-0.142	-2.23	**0.027**	0.53	1.906

a. Dependent Variable: DASS

positive and a significant effect on life satisfaction suggesting that more extraverted and more conscientious healthcare professionals (who are more resilient to life stressors) also have higher levels of life satisfaction during work with COVID-19 patients.

In Table 6 the statistically significant model (R^2=56.2%; F=27.75; p<0.001) showed that type of profession has a significant and positive impact on the level of burnout (B=2.67, p=0.002) in which particularly physicians have a higher level of burnout compared to the nurses. Higher levels of agreeableness (B=-0.21, p= 0.001) as well as emotional stability (B=-0.45, p<0.001) both lead to a significant decrease in intensity levels of burnout.

The statistically significant model (R^2=54.1%; F=25.45; p<0,001) presented in Table 7 showed that both emotional stability (B=-0.10, p< 0.001) and resilience (B=-2.41, p=0.027) have a negative and statistically significant effect on DASS total score. This analysis showed that higher emotional stability and resilience to stress contribute to lower symptoms of depression, anxiety, and stress in frontline healthcare professionals during the COVID-19 pandemic.

DISCUSSION

The findings of this study indicate signs of initial burnout and potential clinical signs of PTSD among Croatian physicians and nurses one year after the pandemic began. This also has been consistent with the results of previous studies examining the consequences of working in COVID-19 departments on the mental health of frontline healthcare professionals. Since the beginning of the pandemic, numerous research has found a significant burden of burnout, PTSD, anxiety, and depression among physicians and nurses (Denning et al. 2021; Uphoff et al. 2021, Yilmaz et. al. 2021). Although an earlier study identified the nurse profession as one of the risk factors for higher incidences of depression, anxiety, insomnia, and stress (Luo et al. 2020), this study indicated significantly higher scores on the burnout scale in physicians compared to nurses. The reason why physicians were so vulnerable to burnout needs further study. We argued that COVID crisis put additional pressure on physicians which brings a greater risk of psychological distress emphasizing the great responsibility of physicians for the lives of patients suffering from a hitherto unknown disease.

Another area of interest in this research was to examine the possible effect of multiple stressors on the mental health of healthcare professionals. Higher levels of burnout, more depressive and anxiety symptoms as well as experiencing more stress were reported by nurses working at University Hospital Dubrava in Zagreb who were simultaneously exposed to affected COVID-19 patients and devastating earthquakes. Accordingly, they also reported lower life satisfaction in comparison with their colleagues working at Clinical Hospital Split. Prior studies have reported that cumulative trauma exposure (in this case to both pandemic and earthquakes) affects mental health, with a higher number of traumatic experiences linearly

associated with an increase in psychological symptoms (Suliman et al. 2009, Di Giuseppe et al. 2021, Saltzman et al. 2021). Differences in psychological symptoms have not been established between physicians working at Split and Zagreb hospitals which may indicate a better psychological adaptation of the physicians to multi-traumatic circumstances. Another possible explanation is that nurses are mostly females who are generally more vulnerable and responsive to the effects of stress than men (Graves et al. 2021). In the same direction, the finding of this study indicates that the female gender is a negative predictor of the severity of PTSS. Our findings are in accordance with several studies showing that health care professionals who are females are more vulnerable and at a greater risk for experiencing more psychological distress (Uphoff et al. 2021, Jalili et al. 2021).

Personal characteristics, primarily emotional stability and resilience to stressful events, have been found as protective factors for the mental health of frontline healthcare professionals. Higher emotional stability predicted lower levels of PTSS and burnout symptoms, as well fewer symptoms of depression, anxiety, and stress in frontline healthcare professionals during the COVID-19 pandemic. This finding is not surprising since emotional stability is negatively related to the core component of burnout, i.e., emotional exhaustion (Ghorpade et al. 2007, Margetić et al. 2021), lower anxiety, and PTSD (Jakšić et al. 2012) as well as lower depression (Uliaszek et al. 2010). Higher resilience is a well-investigated protective mechanism against the consequences of burnout such as trauma reactions, depression, and anxiety (Hu et al., 2015; Taku, 2014). As shown in this study, higher resilience also contributed to lower levels of PTSS and depressive and anxiety symptoms, as well as to higher life satisfaction by enabling healthcare professionals a positive response to pandemic-related stressors in which they can experience growth and development despite challenges. Emotional stability is a protective factor against stress anxiety and burnout. Considering personality traits, higher emotional stability and resilience predicted lower PTSS and DASS symptoms. Traits extraversion ($B=0.17$, $p=0.003$), conscientiousness ($B=0.26$, $p<0.001$) and resilience ($B=1.21$, $p=0.024$) predicted more life satisfaction. Traits of agreeableness ($B=-0.21$, $p= 0.001$) and emotional stability ($B=-0.45$, $p<0.001$) predicted a decrease in the intensity of the burnout. Psychological resilience has also been identified as a protective factor for the mental health of healthcare professionals during the COVID-19 pandemic in the study of Uphoff and his associates (2021). Other personality traits such as extraversion and high conscientiousness also contributed to higher life satisfaction, while higher levels of agreeableness predicted a decrease in the intensity level of burnout.

This study has several limitations that should be taken into consideration. Firstly, using an online survey method limited the study population to volunteers who were willing to participate in the study. Therefore, the convenient sampling may have been a source of bias. For these reasons, the results should be interpreted with caution. Secondly, we investigated the demographic and personal characteristics of the subjects that could contribute to the psychological health of healthcare professionals. Thereby, the possible impact of social factors was not investigated. Thirdly, we examined the presence of psychological symptoms during the first wave of the pandemic. Future research should examine the long-term effects of a prolonged pandemic on the mental health of frontline healthcare professionals, whereby the potential relevance of social factors should be investigated.

CONCLUSIONS

The results of this study recognized the role of personality traits (higher levels of emotional stability, resilience, extraversion, conscientiousness, and agreeableness) as protective factors contributing to psychological well-being and reducing psychopathological symptoms in frontline healthcare professionals. Findings suggest female gender is a predictor for more PTSS, while the physician profession predicts higher burnout symptoms. Exposure to multiple stressors, such as working at COVID departments while experiencing strong earthquakes emerges as a risk factor contributing to more psychological symptoms in nurses.

Given the uncertain duration of the pandemic, the findings of this study may be a guideline for hospital administrations to plan the allocation of staff to COVID-19 departments taking into account individual personality traits and resilience to stressors.

The findings of this study show that individual personality traits and resilience to stressors are important issues and could be included in developing strategies to cope with burnout and psychological well-being among healthcare professionals during pandemic crises. Future research is needed.

Acknowledgments: We are thankful to all healthcare professionals who agreed to participate in this study. Since the beginning of this cataclysmic pandemic, they took care of our health through their dedicated work, risking their well-being and the well-being of their loved ones.

Ethical Considerations: Does this study include human subjects? YES

Authors confirmed the compliance with all relevant ethical regulations.

Conflict of interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Contribution of individual authors: AG performed statistical analyses, wrote the draft version of the manuscript and prepared the tables, refined and edited the draft version of the manuscript. SD conceived the study and participated in its design and coordination, drafted the manuscript and tables; wrote the final version of the manuscript. VA contributed in the conception and design of the manuscript, interpretation of data and manuscript preparation and wrote the final version of the manuscript.

All authors read and approved the final version of the manuscript.

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