




Psychological Functioning of Slovene Adults during the COVID-19 Pandemic: Does Resilience Matter?

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Abstract

As a public health emergency, a pandemic increases susceptibility to unfavourable psychological outcomes. The aim of the present study was to investigate the buffering role of personal resilience in two aspects of psychological functioning, mental health and stress, among Slovene adults at the beginning of the COVID-19 outbreak. Within five days after Slovenia declared epidemics, 2722 participants (75% female) completed an on-line survey measuring mental health and perceived stress as outcome variables and demographics, health-related variables, and personal resilience as predictor variables. Hierarchical logistic regression analyses demonstrated that women, younger, and less educated participants had higher odds for less favourable psychological functioning during the COVID-19 outbreak. In addition, poorer health indicators and COVID-19 infection concerns predicted diminished psychological functioning. The crucial factor promoting good psychological functioning during the COVID-19 pandemics was resilience, additionally buffering against detrimental effects of demographic and health-related variables on mental health and perceived stress. While previous research suggests that mental health problems increase during pandemics, one way to prevent these problems and bolster psychological functioning is to build individuals' resilience. The interventions should be targeted particularly at younger adults, women, less educated people, and individuals who subjectively perceive their health to be rather poor.

Keywords COVID-19 pandemic · Mental health · Stress · Resilience · Health

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Introduction

A pandemic as a public health emergency in itself increases the proneness of people to various mental health problems, which may be further aggravated by the social distancing approach disrupting daily routines, restraining interpersonal communication and limiting the availability of social support [1, 2]. While modern world has faced other epidemics and pandemics before, none of them had such world-wide and drastic effects on most of the individuals and their everyday life as the current COVID-19 pandemic. The present study aimed to elucidate people's psychological functioning at the beginning of COVID-19 outbreak. Besides investigating the role of demographic characteristic and health-related variables in two aspects of individuals' psychological functioning –stress and mental health, special research interest was focused on examining the buffering role of personal resilience.

On 11th of March 2020 The World Health Organization [3] recognized the COVID-19 as a pandemic. Many countries, including Slovenia, took increasingly stricter measures directed towards flattening the curve, i.e. slowing the infection rate of the virus across the population. These measures were primarily focused on social distancing and were to be continued for an unpredictable time. The present study was carried out during the first days of lockdown, characterized by significant changes in all aspects of people's daily lives and high overall worry about the infection, inflated by the exponentially increasing infection and death rates in the neighbouring regions of Italy.

Studies carried out during previous recent outbreaks, such as the 2002–2004 SARS epidemic [4], 2009 Influenza A H1N1 pandemic [5], 2012–2016 MERS outbreaks [6], and the 2013–2016 Ebola epidemic [7], suggested that such outbreaks are accompanied by significant psychological stress in healthcare workers and general population. Increased mental health symptomatic seem to accompany the current COVID-19 pandemic as well [8–10].

Among personal factors affecting psychological functioning during adversity, resilience has been suggested to have a buffering role in pandemic-related stress [4]. The present study investigated resilience at the individual level as a personal quality that helps individuals to thrive in the face of adversity [11]. The positive role of resilience in various stressful situations and life outcomes has been well-documented [12], but its effects on psychological functioning during virus outbreaks remains understudied with a few exceptions [13].

The aim of the present study was to examine psychological functioning during the first days after the declaration of COVID-19 pandemic. We aspired to broaden existing knowledge on psychological functioning during such public health crises by focusing not only on mental health problems (i.e. stress levels) but also on positive mental health, thus adopting the modern view of mental illness and mental health as separate though related entities [14, 15]. Moreover, we investigated the role of potential predictors of psychological functioning. In addition to more commonly explored role of demographic and health-related variables, including people's concern about COVID-19 infection, this study also explored the incremental predictive value of individuals' personality resilience in the context of COVID-19 pandemic. More precisely, resilience was expected to have a two-fold buffering effect: it could (i) inoculate individuals against elevated stress levels and decreased mental health, as well as (ii) weaken the negative impact of potential risk factors (e.g., pre-existing health conditions) on stress and mental health.

Method

Participants and Procedure

The total sample consisted of 2722 participants with a mean age of 36.4 years ($SD = 13.1$). Among them, 32.2% were emerging adults (18–27 years), 40.9% were early adults (28–44 years), 20.7% were middle adults (45–59 years), and 6.1% were late adults (60–82 years). A quarter of the participants (25.1%) were male and three quarters (74.9%) were female. Regarding their education, 32.2% had a high school or lower education and 67.8% attained a post-secondary education or graduate degree.

The data were collected within five days after Slovenia declared epidemics. During these five days, the government closed all sales and service facilities (with the exception of food and pharmacy stores), schools and kindergartens, stopped public transportation, and prohibited public gatherings. Furthermore, COVID-19 claimed its first victim in Slovenia. The data collection took place via an on-line survey platform. The link was distributed via social networks and advertised on the National radio and television's website. On the first page of the survey, the participants were informed about the aims of the study and asked to confirm their informed consent to participate.

Measures

Demographic data collected included information on sex, age, and educational level.

The general health indicators included the presence of at least one chronic health condition (yes/no answer) and subjective reports of health, assessed along a continuous scale ranging from 0 (very bad) to 100 (very good). Two contextualized health-related variables tapped the degree of worry regarding their own and their significant others' possible COVID-19 infection, assessed on a continuous scale ranging from 0 (not at all) to 100 (very good). All continuous scale-scores were dichotomized with scores up to and including 50 regarded as poor health/not worried and scores above 50 as good health/worried.

The 10 item Connor-Davidson Resilience Scale – CD-RISC-10 [16] is a self-report scale that measures how well is one equipped to bounce back after adversity. Each item is rated on a 5-point scale (0 – not true, 4 – true nearly all of the time). In the present study, the participants reported on their resilience for the past week. Previous studies had shown good reliability, validity [16], and measurement invariance across age and sex [17] for the CD-RISC-10. Alpha reliability coefficient in our sample was .94. The resilience score was dichotomized based on a median split (< 27 vs. ≥ 27).

The Perceived Stress Scale – PSS [18] is a self-report 10-item scale, designed to measure the degree to which situations in one's life are appraised as stressful. Using a 5-point rating scale (0 – never, 4 – very often), participants specify how often did they feel or think in a certain way during the last week. The reliability and validity of the PSS had been established as satisfactory [19]. In our study, the alpha reliability coefficient was .89. The perceived stress score was divided into the categories of low vs. high perceived stress based on a median split (< 17 vs. ≥ 17).

The short form of the Mental Health Continuum – MHC-SF [20] consists of 14 items that measure positive mental health. The overall score reflects emotional, psychological and social well-being. Respondents rate the items on a 6-point scale (0 – never, 5 – every day during the past week). The MHC-SF has shown good internal consistency and sound validity [14]. The

alpha coefficient obtained with our sample was .91. The presence of flourishing mental health is indicated when a person feels at least one of the three hedonic well-being symptoms “every day” or “almost every day” and at least six of the eleven psychological and social well-being symptoms “every day” or “almost every day” in the past week. The absence of flourishing mental health reflects moderate to poor well-being.

Results

Demographic characteristics and descriptive statistics were examined for the entire sample and separately for those with flourishing vs. non-flourishing mental health and low vs. high perceived stress in the past week. Overall, 40.7% ($n = 1109$) participants were classified as having flourishing mental health in the past week and 54.4% ($n = 1242$) participants perceived high levels of stress. More precisely, 28.4% of the sample had favourable scores on both indicators of mental health and 42.0% disadvantageous scores on both indicators, while 17.2% reported low stress and low flourishing, and 12.3% high stress and flourishing mental health.

Next, Chi-square tests were performed to examine the association of independent variables with flourishing mental health and high perceived stress. Generally, flourishing mental health was more common among men, older participants, and highly educated participants (Table 1). Flourishing was also more common among participants who reported having good health, had no chronic health conditions and were less worried about their own and other’s potential infection with COVID-19. High stress was associated with female sex, younger age, lower educational level, lower subjective health and worrying about one’s own and other’s potential infection with the new coronavirus. Finally, the strongest association was observed between high resilience and both indicators of good psychological functioning.

Hierarchical logistic regression modelling was employed to examine independent effects of demographic characteristics, health-related variables, and resilience on flourishing mental health and high perceived stress. In the first step, age, sex, and education were entered as covariates in the models. In the second step, self-rated health, chronic health conditions, and worry about one’s own and other’s potential COVID-19 infection were added to the models. Finally, resilience was entered in the models. Except from age, all predictors were treated as categorical.

The results of the first step of the hierarchical logistic regression models (Table 2) revealed that men, older, and more educated participants were more likely to have flourishing mental health during the previous week compared to women, younger, and less educated participants, who were instead more likely to report being highly stressed. Both regression models were significant, but explained rather low shares of variance in the dependent variables (see Nagelkerke R^2 values in Table 2).

Adding health-related variables to the models as covariates revealed that participants who rated their health as poor, reported having chronic health condition(s), and were worried about their own and other’s potential COVID-19 infection were less likely to have flourishing mental health in the previous week, but more likely to report high perceived stress (with one exception – the presence of chronic health conditions was not a significant predictor of high stress). The associations with sex, age, and education remained stable. Again, both models were significant and some additional variance was explained in the two dependent variables.

Lastly, participants who were more resilient during the previous week had almost 7 times higher odds of flourishing mental health and 9.3 times lower odds of high stress levels

Table 1 Demographic characteristics and descriptive statistics for the total sample, and subsamples with flourishing mental health and high perceived stress

	Total	Flourishing (vs. non-flourishing)			High stress (vs. low stress)				
		<i>n</i>	%	$\chi^2_{(df)}$	<i>n</i>	%	$\chi^2_{(df)}$		
Gender									
Male	684	315	46.1	10.67 ₍₁₎	**	269	39.3	88.47 ₍₁₎	***
Female	2038	794	39.0			1211	59.4		
Age									
18–27 yrs.	877	265	30.2	71.34 ₍₃₎	***	581	66.2	88.47 ₍₃₎	***
28–44 yrs.	1114	474	42.5			583	52.3		
45–59 yrs.	564	284	50.4			246	43.6		
≥ 60 yrs.	167	86	51.5			70	41.9		
Education									
Lower (high school or lower)	877	318	36.3	10.77 ₍₁₎	**	517	59.0	10.94 ₍₁₎	**
Higher (post-secondary, graduate)	1845	791	42.9			963	52.2		
Self-rated health									
Poor	676	231	34.2	16.08 ₍₁₎	***	420	62.1	21.82 ₍₁₎	***
Good	2046	878	42.9			1060	51.8		
Chronic health condition									
Yes	801	298	37.2	5.89 ₍₁₎	*	458	57.2	3.60 ₍₁₎	
No	1921	811	42.2			1022	53.2		
Own COVID-19 infection									
Worried	1342	466	34.7	39.71 ₍₁₎	***	876	65.3	126.86 ₍₁₎	***
Not worried	1380	643	46.6			604	43.8		
Others COVID-19 infection									
Worried	1939	730	37.6	26.72 ₍₁₎	***	1153	59.5	70.44 ₍₁₎	***
Not worried	783	379	48.4			327	41.8		
Resilience									
Low (< <i>Mdn</i>)	1276	217	17.0	560.52 ₍₁₎	***	1056	82.8	780.18 ₍₁₎	***
High (≥ <i>Mdn</i>)	1446	892	61.7			424	29.3		

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

compared to those who were less resilient. This was by far the strongest predictor in both models. Moreover, resilience attenuated the negative effects of female sex, lower education, and health-related variables on flourishing mental health. Apart from poor self-rated health, these covariates no longer had significant negative effects. The attenuation effect of resilience was also observed when predicting high levels of stress, although it was weaker, with most of the predictors from previous steps remaining significant. The two final models were significant, with 28% and 40% of variance explained in flourishing mental health and high perceived stress, respectively.

Discussion

The present study investigated the buffering role of personal resilience in two aspects of psychological functioning, stress and mental health, during the outbreak of COVID-19 and subsequent social lockdown, while taking into account individuals' demographic and health-related characteristics.

The results obtained showed that demographic characteristics and health-related variables contribute significantly to favourable psychological functioning during the COVID-19 pandemic, but their predictive value is rather weak and diminishes further once personal resilience is

Table 2 Results of the hierarchical logistic regression models predicting flourishing mental health and high perceived stress

	Flourishing (vs. non-flourishing)			High stress (vs. low stress)			
	<i>B</i>	OR	[95% CI]	<i>B</i>	OR	[95% CI]	
<i>Step 1</i>							
Constant	−1.12	.33		.69	1.99		
Age (in years)	.02	1.02	[1.02, 1.03]	***	−.03	.97	[.97, .98] ***
Gender (Ref= male)	−.29	.75	[.63, .89]	**	.83	2.29	[1.91, 2.74] ***
Education (Ref= lower)	.19	1.21	[1.02, 1.44]	*	−.19	.83	[.70, .98] *
Model $\chi^2_{(df)}$	77.89	(3)***		176.60	(3)***		
Model Nagelkerke <i>R</i> ²	.04			.08			
<i>Step 2</i>							
Constant	−.67	.51		−.03	.97		
Age (in years)	.03	1.03	[1.02, 1.03]	***	−.03	.97	[.96, .98] ***
Gender (Ref= male)	−.23	.79	[.66, .95]	*	.78	2.19	[1.82, 2.64] ***
Education (Ref= lower)	.20	1.22	[1.03, 1.45]	*	−.20	.81	[.68, .97] *
Self-rated health (Ref= good)	−.48	.62	[.51, .75]	***	.65	1.92	[1.57, 2.34] ***
Chronic health condition (Ref= no)	−.25	.78	[.65, .93]	**	.17	1.18	[.98, 1.42]
Own COVID19 infection (Ref= not worried)	−.44	.64	[.54, .76]	***	.82	2.27	[1.90, 2.71] ***
Others COVID19 infection (Ref= not worried)	−.26	.77	[.63, .93]	**	.43	1.53	[1.26, 1.87] ***
Model $\chi^2_{(df)}$	159.13	(7)***		364.67	(7)***		
Model Nagelkerke <i>R</i> ²	.08			.17			
<i>Step 3</i>							
Constant	−1.89	.15		−.02	.98		
Age (in years)	.01	1.02	[1.01, 1.02]	***	−.02	.98	[.97, .99] ***
Gender (Ref= male)	−.01	.99	[.81, 1.21]		.67	1.95	[1.58, 2.41] ***
Education (Ref= lower)	.17	1.18	[.98, 1.43]		−.18	.84	[.69, 1.02]
Self-rated health (Ref= good)	−.25	.78	[.63, .96]	*	.42	1.52	[1.22, 1.91] ***
Chronic health condition (Ref= no)	−.12	.89	[.73, 1.08]		−.02	.98	[.80, 1.22]
Own COVID19 infection (Ref= not worried)	−.14	.87	[.72, 1.06]		.56	1.75	[1.43, 2.14] ***
Others COVID19 infection (Ref= not worried)	−.17	.85	[.69, 1.04]		.36	1.43	[1.14, 1.80] **
Resilience (Ref= low)	1.93	6.91	[5.73, 8.33]	***	−2.23	.11	[.09, .13] ***
Model $\chi^2_{(df)}$	625.09	(8)***		970.28	(8)***		
Model Nagelkerke <i>R</i> ²	.28			.40			

Note. Ref= reference category. * *p* < .05, ** *p* < .01, *** *p* < .001

accounted for. Nevertheless, younger age seems to represent a risk factor for poor psychological functioning during the pandemic, which is consistent with findings in China [9]. This results could be seen as counterintuitive as the symptoms and consequences of the new coronavirus are worse for older as compared to younger adults [21]. However, there is some evidence that flourishing is more common in middle and late adulthood than early and emerging adulthood [22], and the present study suggests that this holds true even in the face of such an adversity as the COVID-19 pandemic. In addition, the present results suggest that women may be at a higher risk for non-flourishing mental health and high stress. While the statistics show somewhat higher COVID-19 mortality rates for men than women [23], our results are in line with the notion that other consequences of the pandemic and lockdown, such as financial challenges, increased informal care of children and their schooling as well as sick family members, and decreased employment

opportunities, could be more detrimental for women than men [24]. This finding is also consistent with previous research showing somewhat higher susceptibility of women to elevated levels of stress and mental health problems than men [25]. Finally, in line with previous findings [26, 27], our results indicated a protective role of higher education in good psychological functioning, although this association was weak and diminished to the level of insignificance after controlling for personal resilience.

Our results further suggest that the subjective perception of one's health is more important for perceived stress and mental health during pandemic than objective health indicators, such as the presence of chronic health conditions. The later variable was included as the COVID-19 mortality rates are higher for people with other medical conditions than those without [28]. However, according to our results psychological functioning outcomes seem to be more contingent on subjective assessment than objective measures of health functioning. Furthermore, high concerns about possible COVID-19 infection also proved a significant predictor of high perceived stress and lower levels of mental health. Nevertheless, the predictive value of subjective and objective health indicators and infection concerns diminished substantially once the resilience was taken into account.

As our results show, the crucial factor of psychological functioning during COVID-19 pandemic seems to be individual level resilience. Even after taking into account demographic characteristics and health-related variables, presumed to be associated with risk of COVID-19 infection and mortality, the probability of experiencing high stress and flourishing mental health during the current pandemic and lockdown depends mostly on the level of personal capability to cope with adversity and achieve good adjustment. The results thus support the hypothesized buffering role of resilience against diminished psychological functioning due to the COVID-19 pandemic and associated preventive measures that may have concurrent and long-lasting negative effects on diverse aspects of people's everyday lives. Furthermore, resilience was found to buffer against detrimental effects of various demographic and health-related variables on mental health as it noticeably attenuated their role in stress and particularly in mental health. These findings corroborate the conceptualization of resilience as a trait that protects individuals against the impact of adversity or traumatic events [11, 29], and extend them to the context of the COVID-19 pandemic with its unprecedented scope and wide-spread corollaries.

The good news concerning our findings is that resilience can be effectively enhanced and thereby the risk of poor psychological functioning due to the pandemic and its consequences can be reduced. Two evidence-based intervention programs may be especially suitable in the pandemic context [4]: (1) Folkman and Greer's approach [30] promotes problem-focused coping for controllable events, emotion-based coping for boosting support and reducing isolation, and meaning-based coping for persistent events; (2) the psychological first aid approach [31] facilitates resilience immediately after trauma. In addition, previous studies provided evidence on effectiveness of several psychological interventions for boosting resilience, for example mindfulness [32], resilience regimen [33], self-efficacy training [34], and cognitive behavioural therapy [35]. The American Psychological Association [36] advises that individuals themselves can advance their resilience by building their social relationships (e.g., by keeping in touch with friends, accepting and offering support), fostering physical and mental wellness (e.g., practicing mindfulness, taking care of one's body), finding purpose (e.g., by helping others, being proactive, setting and moving towards realistic goals), embracing healthy thoughts (e.g., keeping things in perspective, accepting change, staying optimistic) and seeking professional help when feeling unable to function well.

Certain limitations of the study should be highlighted. First, the study relied on self-reported questionnaire data, which are susceptible to various biases [37]. However, stress and well-being are inherently subjective phenomena and thus may be best assessed by self-reports. Second, the data collection took place on an online survey platform. Even though 83% of Slovenians, aged from 16 to 74 years, regularly use the Internet [38], the method of data collection and study advertising may have led to self-selection of participants, especially in late adults as half of the Slovenian adults, aged over 65 years never use the Internet at all [38]. The older adults who did participate in our study are (compared to the non-participating older adults) probably more familiar with modern digital technology, which could be associated with better cognitive and social functioning [39], leading to better mental health and confounding possible age effects investigated in our study. Also, our sample was not representative in terms of sex structure, with more females than males participating. Third, the study presented had a correlational cross-sectional design precluding any causal interpretations. To overcome this drawback, we asked the participants to continue taking part in the study and the follow-up data collection is under way.

The main message for the policy makers, media, educators etc. is that while mental health problems increase during pandemics, one way to prevent these problems and increase good psychological functioning is to build individuals' resilience by educating general public and healthcare workers on evidence-based effective strategies, organizing and promoting intervention programs, and taking measures in work (especially healthcare) organizations aimed at fostering resilience. The results of the present study suggest that the intervention providers should pay special attention to younger adults, women, less educated people and individuals who subjectively perceive their health to be rather poor. In addition, our results support that it is important to consider indicators of both good and poor psychological functioning, as low stress does not necessarily imply flourishing mental health and vice versa [14, 15], and the predictive associations were not the same for stress and mental health.

Author's Contribution All authors contributed to the study conception and design. They also contributed in equal parts to material preparation, data collection, analysis, and manuscript preparation. All authors read and approved the final manuscript.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval The research was approved by the University of Ljubljana, Faculty of Arts Human Research Ethics Committee (#185–2020).

Availability of Data and Material Data available from authors upon request.

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