

## HARDINESS AND PERSONAL RESOURCES OF RED ZONE STAFF: PSYCHOLOGICAL ANALYSIS

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In light of the ongoing COVID-19 pandemic, it is becoming increasingly important to address the problem of resourcefulness in the healthcare personnel of COVID-19 red zones. The aim of this study was to assess hardiness and the state of vital resources in physicians continuously working in red zones and to test a hypothesis that that long-term work in a COVID-19 red zone adversely affects the resourcefulness, reducing resistance to stress. Group 1 ( $n = 94$ ) consisted of physicians with a history of employment in a COVID-19 red zone between May 2020 and June 2021; group 2 ( $n = 77$ ) comprised physicians who were not involved in managing COVID-19 patients. The tests showed that hardiness and its components (commitment, control and challenge) were at high levels in group 2 (59.7%; 67.5%; 61.0%; 20.9%, respectively). The index of resourcefulness (RI; 1.24) reflected the prevalence of personal gains over losses in group 1 over the past year. In this group, there were no sex differences in the results. By contrast, hardiness was significantly reduced in 31.9% of the respondents in group 1 (red zone). Working in the red zone had a devastating effect on all hardiness components: the ratio of the percentages of high to low values was 8.5/27.7 for commitment, 9/6/34.0 for control and 10.6/35.1 for challenge. RI was reduced (0.77). The most pronounced loss of resources was observed in female physicians. The study found a significant mutual impact between challenge and the state of personality resources in red zone staff, which may indicate activation of proactive coping strategies and the acceptance of new professional experience.

**Keywords:** COVID-19, pandemic, pandemic consciousness, mental health, hardiness, personal resources

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## ЖИЗНЕСТОЙКОСТЬ И ПЕРСОНАЛЬНЫЕ РЕСУРСЫ ВРАЧЕЙ «КРАСНЫХ ЗОН» КОВИД-ГОСПИТАЛЕЙ: ПСИХОЛОГИЧЕСКИЙ АНАЛИЗ

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В связи с продолжающейся пандемией COVID-19 особенно актуален вопрос о состоянии психологических ресурсов у врачей, продолжительно работающих в условиях «красных зон». Целью работы было проанализировать специфику состояния жизнестойкости и персональных (витальных) ресурсов врачей, продолжительно работающих в «красной зоне», и проверить гипотезу о том, что продолжительная профессиональная деятельность врачей в «красной зоне» оказывает негативное влияние на систему экзистенциальных и витальных ресурсов, сокращая потенциал стрессоустойчивости личности. Группу 1 ( $n = 94$ ) составили врачи, вовлеченные с мая 2020 г. по июнь 2021 г. в «красную зону» ковид-госпиталей; группу 2 ( $n = 77$ ) — врачи, не участвовавшие в клиническом процессе с ковидными пациентами. По результатам диагностики, врачи группы 2 характеризуются высоким уровнем жизнестойкости и ее компонентов «Вовлеченность», «Контроль», «Принятие риска» (59,7%; 67,5%; 61,0%; 20,9% соответственно). В индексе ресурсности (ИР) (1,24) отражено преобладание персональных приобретений над потерями за прошедший год. Отсутствуют различия по полу. У 31,9% врачей «красных зон» (группа 1) значительно сократился потенциал жизнестойкости. Разрушительному воздействию подверглись все компоненты жизнестойкости: соотношение %-долей высоких/низких значений следующее: «Вовлеченность» — 8,5/27,7; «Контроль» — 9,6/34,0; «Принятие риска» — 10,6/35,1. ИР снижен (0,77). Наиболее выражено сокращение ресурсов у врачей женского пола. Установлено значимое взаимовлияние принятия риска и динамики персональных ресурсов у врачей «красной зоны», что может указывать на активизацию проактивного совладания с опорой на принятие нового профессионального опыта.

**Ключевые слова:** пандемия, COVID-19, пандемическое сознание, психологическое здоровье, жизнестойкость, персональные ресурсы

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The coronavirus has been rampant for over a year now. In all corners of the world, healthcare workers have been on the frontline of the battle against COVID-19. The losses suffered in the strenuous battle for patients' lives and the gains from this experience require detailed analysis.

The first steps in studying the impact of the COVID-19 pandemic on different demographic groups have been already made. The emotional response to the COVID threat in the early months of the pandemic was recognized by psychiatrists and psychologists as a mental health crisis. Prompt measures were expected of public health agencies to deliver psychological support to those in need [1, 2]. Today, questionnaire survey data collected during the first phase of the pandemic are being actively studied by psychology researchers. Their main focus is on coping strategies, risk factors of posttraumatic stress, and changes in the individual and collective consciousness provoked by the ongoing pandemic. An online survey conducted after the 2020 spring to summer lockdown revealed how proactive coping was implemented in different age groups [3]. Drawing on the concept of proactive coping [4], a group of researchers established that the most resourceful coping strategy for young people in the pandemic circumstances, given the low level of stress, was a search for information. At older age, proactive strategies were more diverse, regardless of the amount of stress, suggesting that older adults had a more stable coping system. Another research team analyzed psychological factors contributing to COVID-19-associated posttraumatic stress among Chinese students living in China and abroad. The analysis revealed that students who preferred proactive coping strategies had less pronounced symptoms of COVID-19-related posttraumatic stress disorder than those who resorted to passive coping [5].

The sociopsychological context of the pandemic was analyzed in a series of surveys conducted by the leading Russian psychologists [6]. A divide in society and in the expert community was exposed: there were confronting groups of COVID dissidents and COVID rigorists, which indeed disrupted the positive effect of containment measures. These findings are consistent with the conclusion about the lack of commitment to vaccination among different population groups. This creates barriers to effective communication between the doctor and the patient [7].

A review of the literature on the psychological impact of the pandemic reveals a paucity of data on the resourcefulness of healthcare personnel working in COVID hospitals. Here, the methodology of the resource-based approach that relies on the tenets of existential psychology and psychotherapy elaborated by Frankl, Maddi and Hobfoll [8–15] can serve as a theoretical and methodological basis for empirical research. Hardiness is the most important concept in the context of resourcefulness; it is defined as an attitude that helps a person to stay engaged and avoid the devastating effects of stress [9, 16]. According to Maddi, hardiness provides the courage to not deny stress and to turn stress into an opportunity [16]. A few recent studies demonstrated that high hardiness was a resource for patients with cardiovascular disorders [17], insomnia [18] and depression [19]. Within the scope of our interest are publications that unlock the potential of hardiness in resisting occupational stress in a clinical setting. For example, a study reports a negative correlation between low hardiness and high burnout levels in healthcare workers [20]. Another study demonstrates a link between hardiness and the attitude to work among healthcare professionals [21]. As an integral personality trait, hardiness is determined by professional engagement, satisfaction from work and is not significantly associated with age [22].

Foreign publications also discuss hardiness in the context of resistance to occupational stress. For example, hardiness is a mediator between perceived stress and happiness in nurses [23]. Resilience and well-being of hospice staff, their view of themselves as socially engaged and mentally healthy individuals are significantly correlated with high levels of hardiness [24]. A study conducted on a large sample size in China reports a strong positive correlation between hardiness and physical and mental health in hospital nurses [25].

Apart from the concept of hardiness as an existential resource that confers resistance to stressors, the concept of adaptive resources is also shared by many researchers [26–28]. According to Hobfoll, humans can draw from a variety of means to endure stress [26]. These resources can be broken down in 3 categories, one of them being significance for survival. Vital resources can be grouped into fundamental (essential for survival), secondary, which bolster fundamental resources (e.g., social support) and tertiary (social status, etc.) This approach was used to build a theoretical base for the psychological counseling of individuals facing a critical loss of resources or obstacles for their adequate repletion [28].

Based on the heuristic concepts of hardiness and adaptive resources and the concept of mental health formulated by WHO [29], we defined the aim of this study: to assess hardiness and the state of vital resources in red zone staff and to test the hypothesis that long-term (one year long) work in a COVID red zone adversely affects the resourcefulness of an individual, reducing their resistance to stress.

## METHODS

The study was conducted on a sample of physicians from different healthcare institutions of Krasnodar and Krasnodar region during the COVID-19 pandemic (May 2020 – June 2021).

Two groups were formed. The main group (group 1) consisted of physicians who had been working in COVID-19 red zones during the specified period ( $n = 94$ ); the control group (group 2) comprised physicians who had not been involved in managing COVID-19 patients ( $n = 77$ ). In group 1, 60.0% ( $n = 62$ ) of the participants were women and 34.0% ( $n = 32$ ) were men; in group 2, women made up 66.2% ( $n = 51$ ), whereas men, 33.8% ( $n = 26$ ).

The following inclusion criteria were applied: physicians with a specialty in general medicine; age under 55 years; no life crisis accompanied by emotional distress during the specified period; a history of working in a COVID-19 red zone for group 1 and no such history for group 2.

Exclusion criteria: age above 55 years; a serious life crisis between May 2020 and June 2021.

The methodological principles of subjective activity and resourcefulness concepts [9, 10, 26, 27, 30] were used as a theoretical and methodological basis of our empirical research. Psychological assessment was conducted using surveys based on the theoretical constructs of hardiness [9, 10] and human resource psychology [26–28], including the Hardiness test [31] and the Loss and Gain of Resources test [32].

The Hardiness test is a tool for assessing 3 components that, according to the existential concept, make up hardiness: commitment, control and challenge. Commitment is defined as a conviction that involvement in life results in the highest chance to find something worthy and meaningful [31]. The lack of such conviction breeds a feeling of rejection, a sense of being an outcast in life. The control component shows how confident a person is in his/her ability to change the course of events. A low control score indicates helplessness in a given circumstance.

**Table 1.** Descriptive statistics for hardiness in the studies groups of red zone physicians

Groups	M ± SD, % relative to max	Level (abs./%)		
		high	medium	low
Hardiness				
Group 1 (n = 94)	57.0 ± 15.9* 42.2%	9/9.6% <sup>v</sup>	55/58.5% <sup>vv</sup>	30/31.9% <sup>vvv</sup>
Group 2 (n = 77)	81.6 ± 16.07* 60.5	46/59.7% <sup>v</sup>	27/35.1% <sup>vv</sup>	4/5.2% <sup>vvv</sup>
Commitment				
Group 1 (n = 94)	21.1 ± 6.84** 39.1%	8/8.5% <sup>u</sup>	60/63.8% <sup>uu</sup>	26/27.7% <sup>uuu</sup>
Group 2 (n = 77)	34.2 ± 7.39** 63.3%	52/67.5% <sup>u</sup>	19/24.7% <sup>uu</sup>	6/7.8% <sup>uuu</sup>
Control				
Group 1 (n = 94)	22.0 ± 5.58*** 43.1%	9/9.6% <sup>z</sup>	53/56.4% <sup>zz</sup>	32/34.0% <sup>zzz</sup>
Group 2 (n = 77)	31.5 ± 7.61*** 61.9%	47/61.0% <sup>z</sup>	23/29.9% <sup>zz</sup>	7/9.1% <sup>zzz</sup>
Challenge				
Group 1 (n = 94)	13.9 ± 4.65**** 46.4%	10/10.6% <sup>Δ</sup>	51/54.3%	33/35.1%
Group 2 (n = 77)	15.9 ± 5.25**** 52.9%	16/20.85% <sup>Δ</sup>	42/54.5%	19/24.7%

**Note:** Student's *t* test: \* —  $t = 9.99$ ;  $p < 0.001$ ; \*\* —  $t = 11.9$ ;  $p < 0.001$ ; \*\*\* —  $t = 9.13$ ;  $p < 0.001$ ; \*\*\*\* —  $t = 2.57$ ;  $p < 0.05$ . Fisher's criterion: <sup>v</sup> —  $\varphi^* = 7.39$ ;  $p \leq 0.001$ ; <sup>vv</sup> —  $\varphi^* = 3.09$ ;  $p \leq 0.001$ ; <sup>vvv</sup> —  $\varphi^* = 4.81$ ;  $p \leq 0.001$ ; <sup>u</sup> —  $\varphi^* = 15.9$ ;  $p \leq 0.001$ ; <sup>uu</sup> —  $\varphi^* = 9.65$ ;  $p \leq 0.001$ ; <sup>uuu</sup> —  $\varphi^* = 6.47$ ;  $p \leq 0.001$ ; <sup>z</sup> —  $\varphi^* = 7.56$ ;  $p \leq 0.001$ ; <sup>zz</sup> —  $\varphi^* = 3.53$ ;  $p \leq 0.001$ ; <sup>zzz</sup> —  $\varphi^* = 4.14$ ;  $p \leq 0.001$ ; <sup>Δ</sup> —  $\varphi^* = 1.84$ ;  $p \leq 0.033$ .

Challenge exposes a conviction that whatever happens to a person, it promotes personal growth through knowledge gained from experience and the practical application of this knowledge [31]. The Hardiness test allows assessing the ability and willingness to be active and flexible in a difficult life situation and vulnerability to stress.

The respondents were offered to fill out a questionnaire that contained 45 statements describing different aspects of hardiness. The respondents reported their attitude to each statement by choosing one of four available options (no, more likely no than yes, more likely yes than no, yes). Each answer was rated on the scale from 0 to 3. Since the number of statements describing each hardiness component was different (18 statements for commitment, 17 statements for control and 10 statements for challenge), we compared the total score to the maximum possible total score and expressed the obtained value in %.

The "Loss and Gain of Resources" test [32] was used to analyze the interplay between vital resources during a certain time period (which in our case was from May 2020 to June 2021). The tests consisted of 2 identical lists of 30 resources (intrapersonal, social, material). The respondents rated their emotional response to the gain or loss of a resource on the list on a 5-point scale. The index of resourcefulness (RI) was calculated for each participant as a ratio of the total gain score to the total loss score. The authors of the test propose 3 levels of resourcefulness: low (RI < 0.8), medium (RI from 0.8 to 1.2) and high (RI > 1.2) [32].

Statistical analysis was carried out in SPSS 26.0 (An IBM Company; USA). Both parametric and nonparametric statistical methods were applied (means, standard deviations, Student's *t* test, Pearson's correlation coefficient *r*, and Fisher's  $\varphi^*$ ). The decision to use parametric statistics was based on the results of Levene's *F* test for the homogeneity of variance. The

results of the *F* test for the entire sample and its subsamples corresponded to the significance level < 95.0% ( $p > 0.05$ ), confirming the homogeneity of variance and justifying the use of parametric statistics.

## RESULTS

### Hardiness in Covid red zone staff (Group 1)

Of 94 respondents, high hardiness was observed in only 9 persons (9.6%). More than half of the respondents working in the red zone showed a medium level of hardiness (58.5%;  $n = 55$ ); one-third of the red zone physicians (31.9%;  $n = 30$ ) had low ability to tolerate stress and maintain inner balance (Table 1).

The average hardiness score in group 1 was 57 points (SD = 15.9), i.e. at the borderline between medium and low values (42.2%). The commitment score was the lowest (39.1% relative to the maximum on this scale). Only 8.5% of the respondents ( $n = 8$ ) showed high levels of commitment. Eighty-six respondents had low (27.7%;  $n = 26$ ) or medium (67.8%;  $n = 60$ ) levels of commitment. Control and challenge scores in this group were in the lower part of the medium values spectrum: 43.1% and 46.4%, respectively, relative to the maximum possible scores on these scales. Eighty-five respondents from group 1 scored low (34.0%;  $n = 32$ ) or medium (56.4%;  $n = 53$ ) on the control scale. Only 9.6% of the physicians ( $n = 9$ ) demonstrated high levels of subjective control over the course of events in the presence of occupational stress. High challenge scores were observed in 10 respondents (10.6%). Other 84 doctors in this group had low (35.1%;  $n = 33$ ) or medium (54.3%;  $n = 51$ ) challenge scores reflecting their level of willingness to grow from experience by taking risks.

There is a sex difference in hardiness among red zone physicians (Table 2).

Table 2. Descriptive statistics for hardiness among male and female participants in group 1

Hardiness						
M ± SD	Men: 71.8 ± 12.10*			Women: 54.4 ± 15.5*		
Levels						
	high (total; %)		medium (total; %)		low (total; %)	
Men	4	6.5	35	56.5	23	37.1 <sup>v</sup>
Women	5	15.6	20	62.5	7	21.9 <sup>v</sup>
Commitment						
M ± SD	Men: 23.8 ± 5.78**			Women: 19.7 ± 6.90**		
Levels						
	high (total; %)		medium (total; %)		low (total; %)	
Men	5	15.6	22	68.8	5	15.6 <sup>wv</sup>
Women	3	4.8	38	61.3	21	33.9 <sup>wv</sup>
Control						
M ± SD	Men: 23.5 ± 5.8			Women: 21.2 ± 5.3		
Levels						
	high (total; %)		medium (total; %)		low (total; %)	
Men	4	12.5	21	65.6	7	21.9 <sup>wv</sup>
Women	5	8.1	32	51.6	25	40.3 <sup>wv</sup>
Challenge						
M ± SD	Men: 14.7 ± 5.20			Women: 13.5 ± 4.33		
Levels						
	high (total; %)		medium (total; %)		low (total; %)	
Men	5	15.6	16	50	11	34.4
Women	5	8.1	35	56.4	22	35.5

Note: Student's *t* test: \* —  $t = 5.99$ ;  $p < 0.001$ ; \*\* —  $t = 3.1$ ;  $p < 0.01$ . Fisher's criterion: <sup>v</sup> —  $\varphi^* = 1.54$ ;  $p \leq 0.06$ ; <sup>w</sup> —  $\varphi^* = 2.0$ ;  $p \leq 0.02$ ; <sup>wv</sup> —  $\varphi^* = 1.85$ ;  $p \leq 0.03$ .

Medium hardiness scores ( $M \pm SD$ ) were prevalent in the male subsample ( $t = 5.99$ ;  $p < 0.001$ ), whereas the female subsample was dominated by low hardiness scores ( $\varphi^* = 1.54$ ;  $p \leq 0.06$ ). The level of commitment also differed between the sexes ( $t = 3.1$ ;  $p < 0.01$ ). The female subsample was dominated by low commitment ( $\varphi^* = 2.0$ ;  $p \leq 0.03$ ) and low control ( $\varphi^* = 1.85$ ;  $p \leq 0.02$ ) scores.

### Hardiness in physicians not involved in management of COVID-19 patients (group 2)

In group 2, the average hardiness score was 81.6 points ( $SD = 16.07$ ), i.e. high (60.5% relative to the maximum hardiness score; see Table 1).

On the whole, these findings were consistent with the results of another study conducted in physicians [33]. In that study, physicians with over 5 years of professional experience scored an average of 70.4 points on hardiness, and their commitment, control and challenge scores were 33.2, 24.1 and 13.08, respectively.

In our study, there was a significant difference in the level of hardiness between the groups ( $t = 9.99$ ;  $p < 0.001$ ). Of 77 respondents in group 2, 59.7% ( $n = 46$ ) demonstrated a higher level of hardiness than those in group 1 ( $\varphi^* = 7.39$ ;  $p \leq 0.001$ ). Reduced tolerance to stress, compromising inner balance and preventing the person from succeeding in their activities, was observed in only 5.2% of the respondents in group 2 ( $n = 4$ ); the difference in this parameter was significant between the groups ( $\varphi^* = 4.81$ ;  $p \leq 0.001$ ). Medium hardiness was observed in 35.1% of the respondents ( $n = 27$ ) in group 2, which was much lower than in group 1 ( $\varphi^* = 3.09$ ;  $p \leq 0.001$ ). In group 2, high

tolerance to stress was detected in 59.7% of the respondents ( $n = 46$ ), which was a significantly higher value than in group 1 ( $\varphi^* = 7.39$ ;  $p \leq 0.001$ ).

Unlike red zone doctors, doctors from group 2 demonstrated significantly higher levels of commitment and control (see Table 1). More than half of the respondents in group 2 (67.5%;  $n = 52$ ) reported being actively involved in their daily activities. Low commitment was detected in only 7.8% ( $n = 6$ ) of the respondents in group 2. In comparison with group 1, individuals with high commitment prevailed in group 2; group 1 was dominated by individuals with low commitment ( $\varphi^* = 15.9$  and  $\varphi^* = 6.47$ , respectively;  $p \leq 0.001$ ).

The average control score (the ability to change the course of events) in group 2 was quite high ( $M = 31.5 \pm 7.61$ ; 61.9% from the maximum on this subscale) and significantly higher than in group 1 ( $t = 9.13$ ;  $p < 0.001$ ). Only 7 respondents in group 2 (9.1%) scored low on the control scale, and 61.0% ( $n = 47$ ) thought they were able to control events in their life and make a difference. High control scores were prevalent in group 2 ( $\varphi^* = 7.56$ ;  $p \leq 0.001$ ), as compared to group 1, dominated by low and medium control scores ( $\varphi^* = 3.53$  and  $\varphi^* = 4.14$ , respectively;  $p \leq 0.001$ ).

The average challenge score, i.e. a conviction that every event in life can promote personal growth, was 15.9 points in group 2 ( $SD = 5.25$ ), which was significantly higher than in group 1 ( $t = 2.57$ ;  $p < 0.05$ ), although both parameters fell within the range of medium values. High willingness to take risks was observed in 20.8% of the participants in group 2 ( $n = 16$ ), which again was significantly higher than in group 1 ( $\varphi^* = 1.84$ ;  $p \leq 0.033$ ). However, there were no significant differences in medium and low challenge scores between the groups.

**Table 3.** Descriptive statistics for hardiness among male and female participants in group 2

Hardiness						
M ± SD	Men: 81.4 ± 17.10			Women: 81.7 ± 15.70		
levels						
	high (total; %)		medium (total; %)		low (total; %)	
Men	14	53.8	10	38.5	2	7.7
Women	32	62.7	17	33.4	2	3.9
Commitment						
M ± SD	Men: 33.1 ± 8.29			Women: 34.7 ± 7.49		
Levels						
	high (total; %)		medium (total; %)		low (total; %)	
Men	16	61.5	7	26.9	3	11.6
Women	36	70.6	12	23.5	3	5.9
Control						
M ± SD	Men: 31.0 ± 7.55			Women: 31.8 ± 7.70		
Levels						
	high (total; %)		medium (total; %)		low (total; %)	
Men	13	50	10	38.5	3	11.5
Women	34	66.7	13	25.5	4	7.8
Challenge						
M ± SD	Men: 17.3 ± 5.42			Women: 15.2 ± 5.07		
Levels						
	high (total; %)		medium (total; %)		low (total; %)	
Men	7	26.9	13	50	6	23.1
Women	9	17.6	29	56.9	13	25.5

Interestingly, there were no sex difference in the analyzed parameters among the male and female respondents in group 2 (Table 3).

#### Gain and loss of resources in red zone staff (group 1)

The average RI in group 1 was low (0.77), indicating the prevalence of personal losses over gains in the past year (Table 4). The RI was low for 53 respondents (56.4%) and medium in 32 (34.0%) respondents. Only 9 doctors (9.6%) scored slightly higher on total gains than on total losses; this was largely due to the maximum possible rates (4; 5) given to the following statements: I feel needed; My achievements are recognized by close others; I get support from colleagues.

Low RI was prevalent in the female subgroup vs. the male subgroup (61.3% and 37.5%, respectively;  $\varphi^* = 2.21$ ;  $p \leq 0.013$ ).

**Table 4.** Descriptive statistics for resource gains and losses in the compared groups

	M ± SD			RI (abs./%)		
	Losses	Gains	RI	low	medium	high
Group 1	107.1 ± 15.5 <sup>*1</sup>	79.9 ± 23.1 <sup>*2</sup>	0.77	53/56.4 <sup>*1</sup>	32/34.0 <sup>*2</sup>	9/9.6 <sup>*3</sup>
Men	107.3 ± 16.2 <sup>*3*</sup>	87.8 ± 22.53	0.82	15/46.9 <sup>°</sup>	13/40.6 <sup>Δ1</sup>	4/12.5 <sup>Y1</sup>
Women	107.0 ± 15.3 <sup>*4*</sup>	75.9 ± 22.51 <sup>*5</sup>	0.71	38/61.31 <sup>°v1</sup>	19/30.6 <sup>Δ2</sup>	5/8.1 <sup>Y2</sup>
Group 2	88.4 ± 18.60 <sup>*1</sup>	102.05 ± 23.04 <sup>*2</sup>	1.24	20/26.0 <sup>*1</sup>	13/16.9 <sup>*2</sup>	44/57.1 <sup>*3</sup>
Men	90.8 ± 18.7 <sup>*3</sup>	98.9 ± 22.7	1.17	8/30.8	4/15.4 <sup>Δ1</sup>	14/53.8 <sup>Y1</sup>
Women	87.2 ± 18.0 <sup>*4</sup>	103.7 ± 23.3 <sup>*5</sup>	1.2	12/23.5 <sup>Y1</sup>	9/17.6 <sup>Δ2</sup>	30/58.8 <sup>Y2</sup>

**Note:** Student's *t* test. losses: <sup>\*1</sup> —  $t = 7.03$ ;  $p < 0.001$ ; <sup>\*3</sup> —  $t = 3.56$ ;  $p < 0.01$ ; <sup>\*4</sup> —  $t = 6.22$ ;  $p < 0.001$ ; gains: <sup>\*2</sup> —  $t = 6.24$ ;  $p < 0.001$ ; <sup>\*5</sup> —  $t = 6.41$ ;  $p < 0.001$ . Fisher's criterion. RI levels, low: <sup>°</sup> —  $\varphi^* = 2.21$ ,  $p \leq 0.013$ ; <sup>\*1</sup> —  $\varphi^* = 2.41$ ,  $p \leq 0.007$ ; <sup>v1</sup> —  $\varphi^* = 4.16$ ,  $p \leq 0.001$ ; medium: <sup>\*2</sup> —  $\varphi^* = 2.59$ ,  $p \leq 0.004$ ; <sup>Δ1</sup> —  $\varphi^* = 2.17$ ,  $p \leq 0.015$ ; <sup>Δ2</sup> —  $\varphi^* = 1.61$ ,  $p \leq 0.05$ ; high: <sup>\*3</sup> —  $\varphi^* = 7.04$ ,  $p \leq 0.001$ ; <sup>Y1</sup> —  $\varphi^* = 3.50$ ,  $p \leq 0.001$ ; <sup>Y2</sup> —  $\varphi^* = 6.19$ ,  $p \leq 0.001$ .

#### Gain and loss of resources in physicians not involved in management of COVID-19 patients (group 2)

The average RI in group 2 was high (1.24), indicating the prevalence of personal gains over losses in the past year. The RI was low for 26.0% of the respondents ( $n = 20$ ). More than half of the doctors in group 2 thought that they had increased their resourcefulness in the past year (57.1%;  $n = 44$ ). All studied parameters differed significantly between the groups (Table 4).

#### Correlation analysis

Strong negative and positive correlations were established between hardiness, its constituents and the loss and gain scores (Table 5).

Most of the detected correlations were characterized by significant ( $0.05 < p < 0.1$ ) negative or positive values of the

**Table 5.** The correlation matrix (*r*) for hardiness, its components and gain and loss scores on the self-assessment scale

Group 1			Group 2		
Total (n = 94)			Total (n = 77)		
	losses	gains		losses	gains
Commitment	-0.491	0.677	Commitment	-0.661	0.74
Control	-0.508	0.597	Control	-0.624	0.701
Challenge	-0.556	0.561	Challenge	-0.128*	0.238*
Hardiness	-0.551	0.663	Hardiness	-0.641	0.75
Women (n = 62)			Women (n = 51)		
Commitment	-0.501	0.623	Commitment	-0.608	0.72
Control	-0.484	0.54	Control	-0.577	0.717
Challenge	-0.453	0.498	Challenge	-0.069*	0.258*
Hardiness	-0.516	0.602	Hardiness	-0.573	0.752
Men (n = 32)			Men (n = 26)		
Commitment	-0.561	0.646	Commitment	-0.74	0.777
Control	-0.583	0.646	Control	-0.711	0.666
Challenge	-0.733	0.65	Challenge	-0.295*	0.273*
Hardiness	-0.665	0.723	Hardiness	-0.766	0.757

**Note:** \* — *r* is below the significance threshold ( $p > 0.05$ ).

*r*-coefficient in both samples. The established correlations were not sex-specific. Nevertheless, in group 2 the challenge score and the loss and gain score were mutually influential. Unlike group 1, in group 2 gains and losses were not associated significantly with experience acquired over the past year and the practical application of this experience. In general, in group 2 and male and female subgroups, the correlation coefficient was below the critical threshold for the corresponding sample size ( $p > 0.05$ ).

## DISCUSSION

Our findings indicate a negative psychological effect of long-term work in a COVID-19 red zone. All studied parameters were significantly lower in red zone staff than in healthcare workers not involved in the management of COVID-19 patients. Work overload and daily emotional distress undermine the ability to endure occupational stress and maintain inner balance (hardiness). This is most clearly manifested in reduced commitment, the feeling of being rejected or being an outsider to life, development of a non-constructive pandemic consciousness, i.e. a growing conviction that it is impossible to have control over one's own life or influence the course of events, and helplessness in difficult life situations and in the presence of occupational stress.

Direct consequences of low hardiness include low RI, the lack of personal resources, the prevalence of losses over gains, and a pessimistic assessment of personal gains.

The analysis of data generated by group 1 shows that men are slightly more successful in preserving their commitment than women. This is also reflected in higher RI among males, which falls within a domain of medium values (0.82 vs. 0.71 in women).

Group 2 was characterized by better hardiness potential and stronger vital resources. Drawing on the literature data [33], we conclude that the discovered characteristics of group 2 could be viewed as an element in the psychological profile of Russian physicians that enriches the psychological model of a medical doctor's personality [34].

The established correlations suggest a systemic link between existential and vital resources of a medical doctor. The

role of challenge in the perception of resource gains and losses by red zone staff, contrary to physicians not involved in the management of COVID-19 patients, may indicate the ongoing pursuit of meaning in the professional activity. The search for meaning may reflect the activation of proactive coping strategies (transformational coping, according to Maddi) in an effort to maintain resistance to stress. These findings are consistent with the literature [35].

High levels of resource losses reported by red zone physicians may be attributed to the weakness of their existential resources, whereas high levels of hardiness and its components among other physicians are directly associated with their optimistic assessment of resource dynamics, with gains prevailing over losses.

## CONCLUSIONS

Modern psychology, including occupational medical psychology, is confronted with the psychosocial consequences of the COVID-19 pandemic that require thorough and prompt analysis. Our study has confirmed the hypothesized negative impact of long-term (one year long) work in a COVID-19 red zone on the system of existential and vital resources, compromising resistance to stress. The most pronounced manifestation of this process is significant depletion of personality resources, reduced hardiness (ability to endure stress), reduced adaptive potential of being involved in and having control over one's own life. As these tendencies progress, they may result in the existential vacuum, a personality crisis characterized by the lack of meaning of one's existence. This may breed noogenic neurosis, i.e. disruption of psychological well-being, which is the critical component of human health. Our findings may be used to create a roadmap for psychological counselling of healthcare workers during the ongoing pandemic. Such counseling should focus on the activation of commitment as a component of hardiness, finding the meaning in professional activities, acknowledging the significance of professional experience, repletion of vital resource, including rest, acquiring basic knowledge of psychophysiological self-regulation and stress reduction, and formation of proactive coping strategies.

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