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The relationship between the personality traits with COVID-19 in intensive care professionals: A cross-sectional study

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ABSTRACT

Aim: To investigate the relationship between personality traits and COVID-19 in intensive care professionals. In addition, demographic, occupational, institutional data, symptoms and characteristics related to COVID-19 are evaluated.

Methods: We conducted a multicenter, cross-sectional study with 218 intensive care professionals who had and did not have COVID-19 infection from June 2020 to September 2020. The study population consisted of physicians, nurses, and allied health personnel working in intensive care units in Turkey. The data were collected through an online questionnaire including demographics, occupations and institutions, Personality Belief Questionnaire (PBQ) scores, symptoms, and characteristics related to COVID-19 disease.

Results: This study showed that intensive care professionals who were younger, single, and had asthma experienced a much higher risk of COVID-19 compared to those who did not have COVID-19. Intensive care professionals who were physicians experienced a much higher risk of infection than nurses. Among these intensive care professionals having COVID-19 disease, the personality traits questionnaire showed that COVID-19 positivity resulted in dependent, antisocial, and borderline personalities. Among the intensive care professionals with COVID-19 disease, the nurses had a significantly higher risk of fever and chest pain.

Conclusions: The present study reveals a higher prevalence of dependent, antisocial, and borderline personality traits among intensive care professionals who tested positive for COVID-19. Regarding personnel, better exploration of these factors could contribute to more effectively adapting to and combating the challenges of future public health crises.

Key words: COVID-19, intensive care professionals, mental health, pandemic, personality traits.

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Introduction

Coronavirus Disease 2019 (COVID-19) is a respiratory illness caused by the coronavirus, which was initially identified in Wuhan, China, in December 2019. This highly contagious disease could begin with flu-like symptoms. The primary clinical manifestations of this disease encompass symptoms such as fever, headache, myalgia, fatigue, rhinorrhea, cough, mild dyspnea, sore throat, and conjunctivitis [1]. On the other hand, COVID-19 infections range from being asymptomatic to severely symptomatic [2]. The World Health Organization (WHO) recognized the disease as a pandemic following its rapid spread worldwide [3]. COVID-19 was

reported as the first case in Turkey on March 11, 2020, and as of today, it has caused more than 17 million positive cases and more than 102 thousand deaths [4].

The COVID-19 pandemic has far-reaching impacts on both the physical and mental health of the population, including healthcare professionals. COVID-19 has ushered in a multitude of transformations, encompassing significant shifts in personal and social life as well as healthcare practices. These changes also include the implementation of preventive measures, such as social isolation. The COVID-19 pandemic is affecting not only physical health but also mental health. The uncertainty surrounding the evolving situation can heighten societal anxiety [5]. Various studies have demonstrated that epidemics can profoundly affect the psychological state of communities. The initial phases of the COVID-19 pandemic in China, for instance, showed that most participants experienced moderate to severe psychological effects [6]. As a consequence of lockdown measures and the closure of educational institutions and businesses, the pandemic has had a substantial impact on individuals' everyday routines, leading to mental health challenges such as heightened anxiety and depression [7].

Throughout and after the COVID-19 pandemic, the number of trials aiming to explore the psychological impact of COVID-19 continues to increase, including specific populations such as intensive care professionals. Among these specialized groups, intensive care professionals face heightened pressures due to increased workloads, infection risks, and the same risk factors affecting the general population [8].

While there are existing studies examining the relationship between personality traits and various diseases [9], there is a need for more research investigating the link between personality traits and COVID-19, especially among intensive care professionals, including physicians, nurses, and allied health personnel. We, therefore, hypothesized that personality traits would have an essential effect on COVID-19. The primary objective of this study is to investigate the relationship between personality traits and COVID-19 in intensive care professionals. Also, the secondary objective is to evaluate the demographics, occupation, institution data, symptoms, and characteristics related to COVID-19.

Materials and methods

Ethics committee approval and study protocol: The study obtained ethics committee approval from the Non-Interventional Research Ethics Committee of Bezmialem Vakıf University (dated May 5, 2020, decision number: 06/111). The study was conducted in accordance with the ethical guidelines outlined in the 1964 Declaration of Helsinki and its subsequent revisions, or equivalent ethical standards. The study comprised a multicenter, cross-sectional study involving 218 intensive care professionals who both had and did not have COVID-19 infection, conducted from June 2020 to September 2020. Informed consent was obtained from the intensive care professionals, with the assurance that their personally identifiable information would remain confidential. Also, a study was performed on the voluntary participants regarding data privacy.

Participant selection: We administered a questionnaire-based survey to evaluate the psychological shifts encountered by intensive care professionals in the midst of the COVID-19 pandemic. A total of 218 intensive care professionals, consisting of physicians, nurses,

and allied health personnel, employed in various healthcare settings, including university hospitals, training and research hospitals, as well as private hospitals located in Turkey, were enrolled in the study.

Data collection: Data collection was carried out through an online questionnaire including demographics, occupations and institutions, Personality Belief Questionnaire (PBQ) scores, symptoms, and characteristics related to COVID-19 disease. Demographics comprised the participant's age, gender, marriage status, smoking, comorbidities, and blood type. Symptoms and characteristics related to COVID-19 consisted of prophylaxis, cough, dyspnea, fever, muscle pain, confusion, headache, sore throat, rhinorrhea, chest pain, gastrointestinal symptoms, follow-up, oxygen support, and nasal oxygen. The questionnaire form was created for this cross-sectional study and was sent to the intensive care professionals online via e-mail.

Personality Belief Questionnaire-short form: Personality Belief Questionnaire, consisting of 126 questions, was developed in 1991 by examining beliefs related to nine personality disorders [8]. Afterwards, the items of the same questionnaire with high distinctiveness were selected, and a short form of Personality Belief Scale consisting of 65 questions was developed [9]. Turkish validity and reliability studies of the personality belief questionnaire and its short form have been carried out and translated into Turkish [12-14].

The questionnaire determines the person's beliefs about himself and his environment. The questions consist of statements belonging to ten types of personality disorder. Each subscale composed of 7 items corresponds to 1 personality disorder. There are ten scales in total, evaluating ten personality disorders. These personality disorders are classified as avoidant, dependent, passive-aggressive, obsessive-compulsive, antisocial, narcissistic, histrionic, schizoid, paranoid, and borderline. The scale has ten personality disorders but 65 questions instead of 70. The five items used to evaluate borderline personality disorder are also used in other personality disorder scales. After reading each item, the participants respond to the extent to which the statements in the items fit them, ranging from (0) I do not believe at all to (4) I completely believe.

Statistical analysis: Statistical analysis was achieved using the Statistical Package for Social Sciences Statistics for Windows, SPSS, and Version 22.0 Software. Armonk, NY: IBM Corp. Quantitative data were presented as median (minimum-maximum), and qualitative data were presented as numbers and percentages. The Kolmogorov–Smirnov normality test was used to examine quantitative data for a normal distribution. The chi-square test and Mann-Whitney U test evaluated the differences between groups. A value of p below 0.05 was considered statistically significant

Results

A total of 218 intensive care professionals participated in this study. The ages of COVID-19-positive participants were notably lower than those of COVID-19-negative participants, with a median age of 31.00 (ranging from 21.00 to 66.00) compared to 35.00 (ranging from 24.00 to 65.00), and this difference was statistically significant (p=0.047). The number of married participants who tested positive for COVID-19 was significantly lower than those who tested negative (p=0.023). The prevalence of asthma among COVID-19-positive participants was significantly higher compared to COVID-19-negative participants [10 (9.1%) vs 2 (1.9%), respectively, p=0.019]. There were no significant

differences between the COVID-19 positive and negative participants in terms of gender, smoking, hypertension, diabetes mellitus, coronary artery disease, hypothyroidism, obesity, and blood types (p>0.05). The demographics are presented in Table 1.

Among these analyses, physicians experienced a much higher risk of infection than nurses. Also, intensive care professionals working at training and research hospitals and private hospitals had a much higher risk of infection. Occupation and institution data were presented in Table 2.

Table 1. Demographics.

Parameters		**COVID-19 positive (n=110)**	**COVID-19 negative (n=108)**	***p*-value**
Age, years [med (min-max)]		31.00 (21.00-66.00)	35.00 (24.00-65.00)	**0.047***
Gender (n, %)				0.502**
	Male	50 (45.5)	54 (50)	
	Female	60 (54.5)	54 (50)	
Marriage status (n, %)				**0.023****
	Married	61 (55.5)	76 (70.4)	
	Single	49 (44.5)	32 (29.6)	
Smoking (n, %)				0.081**
	Yes	25 (22.7)	36 (33.3)	
	No	85 (77.3)	72 (66.7)	
Comorbidities (n, %)				
	Hypertension	11 (10.0)	10 (9.3)	0.853**
	Diabetes Mellitus	4 (3.6)	2 (1.9)	0.683***
	Asthma	10 (9.1)	2 (1.9)	**0.019****
	Coronary artery disease	7 (6.4)	3 (2.8)	0.332***
	Hypothyroidism	6 (5.5)	6 (5.6)	0.974**
	Obesity	6 (5.5)	1 (9.9)	0.119***
	Other	9 (8.2)	8 (7.4)	0.831**
Blood type (n, %)				0.214***
	0 rh -	6 (5.5)	2 (1.9)	
	0 rh +	24 (21.8)	33 (30.6)	
	A rh -	9 (8.2)	3 (2.8)	
	A rh +	50 (45.5)	44 (40.7)	
	B rh -	1 (0.9)	3 (2.8)	
	B rh +	15 (13.6)	15 (13.9)	
	AB rh +	5 (4.5)	8 (7.4)	

*Quantitative data were presented as med (min-max) and analyzed by Mann Whitney U test. Qualitative data were presented as numbers and percentile and analyzed by Pearson Chi-Square and Fisher's Exact tests. COVID-19: Coronavirus disease 2019, max: Maximum, med: Median, min: Minimum, n; number, p<0.05; statistically significant, * Mann Whitney U test, **Pearson Chi-Square test, ***Fisher's Exact test*

There was a significant difference between the COVID-19 positive and negative participants in terms of occupation and institution (p<0.001). In the evaluation of personality traits questionnaire, there was a significant difference between the COVID-19 positive and negative

participants in terms of dependent, antisocial, and borderline personality traits (p=0.016, p=0.049, p=0.037, respectively). On the other hand, the other personality traits, such as avoidant, passive-aggressive, obsessive-compulsive, narcissistic, histrionic, schizoid, and paranoid, were similar between the COVID-19 positive and negative participants. The personality traits questionnaire is presented in Table 3.

The three most common symptoms related to COVID-19 were muscle pain (n=71, 50.0%), cough (n=55, 50.0%) and fever (n=50, 45.5%), respectively. Sixty participants (54.5%) with COVID-19 had lost the sense of smell and taste. And also, seventy-three (66.4%) participants with COVID-19 followed up at home. Incidences of symptoms and characteristics related to COVID-19 are presented in Table 4.

Table 2. Occupation and institution.

Parameters		**COVID-19 positive (n=110)**	**COVID-19 negative (n=108)**	***p*-value**
Occupation (n, %)				**<0.001***
	Physician	48 (43.6)	93 (86.1)	
	Nurse	32 (29.1)	0 (0)	
	Allied health personnel	30 (27.3)	15 (13.9)	
Institution (n, %)				**<0.001***
	University Hospital	14 (12.7)	23 (21.3)	
	Training and research hospital	38 (34.5)	28 (25.9)	
	Private hospital	49 (44.5)	25 (23.1)	
	Other (state hospital, etc.)	9 (8.2)	32 (29.6)	

*Qualitative variables were performed by Pearson Chi-square test. COVID-19: Coronavirus disease 2019, n; number, p<0.05; statistically significant, *Pearson Chi-Square test.*

Table 3. Personality traits questionnaire.

Variables	**COVID-19 positive (n=110) [med (min-max)]**	**COVID-19 negative (n=108) [med (min-max)]**	***p*-value**
Avoidant	1.86 (0.14-4.00)	1.86 (0.14-4.00)	0.548*
Dependent	1.00 (0.00-4.00)	0.71 (0.00-4.00)	**0.016***
Passive-Aggressive	1.57 (0.29-4.00)	1.71 (0.00-4.00)	0.267*
Obsessive-Compulsive	2.00 (0.14-4.00)	2.00 (0.14-4.00)	0.618*
Antisocial	1.29 (0.00-4.00)	1.00 (0.00-4.00)	**0.049***
Narcissistic	1.29 (0.00-4.00)	1.14 (0.00-4.00)	0.888*
Histrionic	0.86 (0.00-4.00)	0.86 (0.00-4.00)	0.720*
Schizoid	1.86 (0.00-4.00)	1.86 (0.14-4.00)	0.694*
Paranoid	1.43 (0.00-4.00)	1.43 (0.00-4.00)	0.885*
Borderline	1.29 (0.00-4.00)	1.00 (0.00-4.00)	**0.037***

*Quantitative data were presented as med (min-max) and analyzed by Mann Whitney U test. COVID-19: Coronavirus disease 2019, max: Maximum, med: Median, min: Minimum, n; number, p<0.05; statistically significant, * Mann Whitney U test.*

Table 4. Incidences of symptoms and characteristics related to COVID-19**.**

Variables		COVID-19 positive
Prophylaxis		41 (37.3)
Cough		55 (50.0)
Dyspnea		38 (34.5)
Fever		50 (45.5)
Muscle pain		71 (64.5)
Confusion		4 (3.6)
Headache		49 (44.5)
Sore throat		38 (34.5)
Rhinorrhea		16 (14.5)
Chest pain		20 (18.2)
Gastrointestinal symptom		44 (40.0)
Sense of smell and taste		
	Yes	60 (54.5)
	No	50 (45.5)
Follow-up		
	None	0 (0.0)
	Home	73 (66.4)
	Hospital	37 (33.6)
Oxygen support		12 (10.9)
Nasal oxygen		12 (10.9)

*Qualitative variables were analyzed by the Pearson Chi-square test. COVID-19: Coronavirus disease 2019, n; number, p<0.05; statistically significant, *Pearson Chi-Square test.*

There was a significant difference between the different intensive care professionals regarding fever and chest pain (p=0.032 and p=0.003, respectively). And also, the other symptoms and characteristics related to COVID-19 were similar in different intensive care professionals. A comparison of the symptoms and characteristics related to COVID-19 in different intensive care professionals is presented in Table 5.

Discussion

We conducted a multicenter, cross-sectional study involving 218 intensive care professionals to investigate the relationship between personality traits and COVID-19. This study showed that intensive care professionals who were younger, single and had asthma experienced a much higher risk of COVID-19 disease. Moreover, physicians had a notably higher risk of infection compared to nurses. Dependent, antisocial, and borderline personalities are more prevalent among intensive care professionals who were COVID-19 positive. The three most common symptoms related to COVID-19 were muscle pain, cough, and fever, respectively. Among the intensive care professionals with COVID-19 disease, the nurses had a significantly higher risk of fever and chest pain.

The COVID-19 pandemic has significantly affected the world since the end of 2019. Studies have shown that a significant part of people's compliance with many precautions, such as isolation, social distance, and wearing facemasks, depends on their personality traits [15-17]. Previous studies and reviews showed that working in COVID-19 wards affected healthcare professionals' mental health regarding high rates of anxiety, depression, burnout, insomnia, and post-traumatic stress disorder symptoms [18,19].

On the other hand, the psychological effect of healthcare professionals working in intensive care units was exceptionally high due to their intense exposure to the impact of the pandemic. A cross-sectional study assessing the psychological impact of the pandemic on intensive care professionals revealed a substantial prevalence of mental health issues. [20]. Likewise, our study revealed a significant difference between participants who tested positive for COVID-19 and those who did not regarding dependent, antisocial, and borderline personality traits.

Table 5. A comparison of the symptoms and characteristics related to COVID-19 in different intensive care professionals.

Parameters		COVID-19 positive (n=110)			*p*-value
		Physicians (n=48) (n, %)	Nurses (n=32) (n, %)	Allied health personnel (n=30) (n, %)	
Cough		21 (43.8)	16 (50.0)	18 (60.0)	0.377*
Dyspnea		17 (35.4)	13 (40.6)	8 (26.7)	0.506*
Fever		23 (47.9)	19 (59.4)	8 (26.7)	**0.032***
Muscle pain		35 (72.9)	18 (56.3)	18 (60.0)	0.259*
Confusion		4 (8.3)	0	0	0.093**
Headache		19 (39.6)	17 (53.1)	13 (43.3)	0.484*
Sore throat		13 (27.1)	12 (37.5)	13 (43.3)	0.312*
Rhinorrhea		5 (10.4)	8 (25.0)	3 (10.0)	0.152**
Chest pain		6 (12.5)	12 (37.5)	2 (6.7)	**0.003***
Gastrointestinal		24 (50.0)	10 (31.3)	10 (33.3)	0.167*
Sense of smell and taste					0.259*
	Yes	22 (45.8)	19 (59.4)	19 (63.3)	
	No	26 (54.2)	13 (40.6)	11 (36.7)	
Follow-up					0.902*
	Home	32 (56.7)	22 (68.8)	19 (63.5)	
	Hospital	16 (33.3)	10 (31.3)	11 (36.7)	

Qualitative variables were analyzed by the Pearson Chi-square test. COVID-19: Coronavirus disease 2019, n; number, $p<0.05$; statistically significant, *Pearson Chi-Square test, ** Fisher's Exact test

Healthcare institutions played a crucial role in the transmission of diseases during previous pandemics, such as MERS-CoV. Healthcare professionals who have been infected can be both symptomatic and asymptomatic [21]. During this respiratory epidemic, all healthcare professionals are exposed to some risk of infection; however, this risk is not equal for all healthcare professionals. Some departments, such as emergency ward and intensive care professionals, are likely to be at higher risk than others less relevant to infection [22]. Lu et al. revealed that healthcare professionals working in COVID-19 high-risk environments exhibited elevated levels of anxiety and depression compared to their hospital peers in lower-risk areas [23]. The anxiety and nervousness felt by healthcare professionals are common in any pandemic, but their intensity varies. Although there are previous studies on anxiety during the pandemic [24], there is not enough study in the literature to determine the personality traits of healthcare professionals infected during the pandemic. This study focused on specific professionals with a high risk of infection, such as different intensive care professionals, regarding the relationships between personality traits and the COVID-19 pandemic.

Among healthcare professionals, nurses have played a remarkable and crucial role in the fight against the COVID-19 pandemic. Nurses who served in roles such as emergency, infection control, intensive care, and the care of COVID-19 patients during the pandemic exhibited unwavering dedication to their profession [25]. In their study assessing stress, depression, and

burnout levels among front-line nurses, Murat et al. found that nurses who had tested positive for COVID-19 and were unwilling to work voluntarily during the pandemic experienced higher levels of burnout [24]. In contrast, our study revealed a significant difference between participants who tested positive and negative for COVID-19 based on their occupations. Specifically, physicians faced a substantially greater risk of infection compared to nurses.

Previous studies carried out during the COVID-19 pandemic have substantiated the significant prevalence of healthcare professionals experiencing fear of infection and its adverse effects on their personality traits [27]. Troisi et al. reported that fear of infection could be predicted independently by two personality traits: neuroticism and fearful attachment [28]. Pandemic conditions have prolonged social restrictions, severely impacting daily routines and leading to increased social isolation. These constraints on social interaction can contribute to emotional dysregulation and difficulties in interpreting the emotional cues of others, potentially resulting in borderline personality traits [29]. Our study showed that three personality traits, dependent, antisocial, and borderline, were more prevalent among intensive care professionals who were COVID-19 positive. In this respect, Yudhantara et al.'s [29] results were similar to ours. Starcevic et al [30] suggest that high levels of neuroticism constitute a risk for pandemic-induced distress and poor overall coping. People with prominent extraversion, conscientiousness or agreeableness have generally demonstrated a good adjustment to the pandemic, including compliance with containment and mitigation measures imposed by the authorities to limit the spread of COVID-19. A few studies of individuals with borderline personality disorder identified social isolation as the most destabilising factor for them. Poor compliance with containment and mitigation measures has been strongly associated with various antisocial personality traits. Grubbs et al [31] suggested that baseline levels of narcissistic antagonism were associated with lower levels of social distancing and lower compliance with public health recommended behaviors. Similarly, dominance oriented moral grandstanding motivations predicted greater conflict with others over COVID-19, greater engagement in status-oriented social media behaviors about COVID-19, and lower levels of social distancing.

This study had several limitations. Firstly, the small number of participants. Secondly, our country's total number of COVID-19-infected intensive care professionals needed to be clarified. We were able to reach patients who were diagnosed with COVID-19 disease. Thirdly, not all intensive care professionals were able to complete our survey, potentially introducing selection bias. Fourthly, our survey was conducted during the pandemic, which may miss intensive care professionals who will be infected with COVID-19 in the future. Lastly, we were unable to determine the personality traits of patients who were either being treated in the intensive care unit or had succumbed to COVID-19 infection. These limitations should be taken into consideration when interpreting the results of our study.

Conclusions

The present study reveals a higher prevalence of dependent, antisocial, and borderline personality traits among intensive care professionals who tested positive for COVID-19. Some personality-based factors, such as those in the examples above, revealed in the results of our study, explain some individual differences regarding the requirements for both working in

areas such as intensive care related to COVID-19, coping with threats and distress, and complying with containment and mitigation measures. As it relates to personnel, a better understanding of these factors can contribute to more effectively adapting to and combating the challenges of future public health crises

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