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DSM-5 pathological personality domains as vulnerability factors in predicting COVID-19-related anxiety symptoms

Mehdi Zemestani, PhD[a], Mohammad Babamiri, PhD[b], Mark D. Griffiths, PhD[c], and Reza Didehban, MSc[a]

[a]Department of Psychology, University of Kurdistan, Sanandaj, Iran; [b]Health Sciences Research Center, Department of Ergonomics, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran; [c]Psychology Department, Nottingham Trent University, Nottingham, UK

ABSTRACT

Since the beginning of the coronavirus disease-2019 (COVID-19) outbreak, individuals worldwide have shown different anxiety-related reactions. Several vulnerability factors may play a role in individuals' psychological reactions to the COVID-19 pandemic. Such factors include pathological personality traits which have been shown to contribute to the development of anxiety-related conditions. Consequently, the present study investigated the relationships between DSM-5 pathological personality domains and COVID-19-related anxiety symptoms. Using an online data portal, the relationships between DSM-5 pathological personality domains and COVID-19-related anxiety symptoms among a mixed university student and community sample (N = 612) were studied. The results showed that there was a positive and significant relationship between all DSM-5 pathological personality domains and COVID-19-related anxiety. The results of multiple linear regression analysis showed that DSM-5 pathological personality domains explained 21% of COVID-19-related anxiety variance. Based on standardized coefficients, the Personality Inventory for DSM-5 (PID-5) negative affect domain had the main role in COVID-19-related anxiety. The findings suggest that pathological personality domains can be predictors in the symptoms of anxiety in a viral outbreak. The novel findings add to the literature on individual differences in domains of personality in response to pandemic situations. Implications for future clinical applications and research investigations are discussed.

KEYWORDS

DSM-5; pathological personality traits; anxiety; COVID-19

Introduction

Since December 2019, the outbreak of coronavirus disease 2019 (COVID-19) has infected more than 54.32 million individuals and caused more than 1.31 million deaths worldwide (World Health Organization, 2020). The COVID-19 pandemic has deeply disrupted daily life across the globe, and is having profound effects on both mental and physical health. Consequently, research into the resulting health effects of the COVID-19 pandemic has been identified as an important priority by health organizations (Holmes et al., 2020). As with previous epidemics and pandemics, the COVID-19 pandemic is currently causing high anxiety about the illness (Banerjee, 2020).

With the extremely high infection rate and relatively high mortality, individuals naturally worry about COVID-19, and as countries report new cases every day, there has been widespread "panic-related" and "anxiety-related" symptoms (e.g., worry, irritability, feeling

nervous, restless or tense, avoiding activities, places, or people) to an unknown illness (Ahorsu et al., 2020). An Angus Reid poll of 1354 Canadian adults conducted in early February 2020 indicated that one-third of respondents were worried about the COVID-19. At the time of the poll, only four Canadians were infected in a country of approximately 37 million people (Angus Reid Institute, 2020). Broadly similar findings have been reported in other affected countries. It has been stressed that the psychological effects of the current pandemic may be profound, and that the excessive fear of COVID-19 is high in some countries such as Iran which has had the majority of cases in the Middle East region (Abdi., 2020; Pakpour & Griffiths, 2020; Zhuang et al., 2020).

COVID-19-related anxiety (which has been called 'coronaphobia' by some [Asmundson & Taylor, 2020a]) is likely due to its novelty and the uncertainties about how bad the current outbreak might become. Research investigating the psychological reactions to previous epidemics and pandemics suggests that various psychological vulnerability factors may play a role in COVID-19-related anxiety, including individual difference variables such as personality traits, anxiety proneness, perceived vulnerability to disease, health anxiety, and intolerance of uncertainty (Asmundson & Taylor, 2020a, 2020b; Satici, Saricali, Satici, & Griffiths, 2020; Somma et al., 2021; Taylor, 2019). However, further research is needed to understand how individual difference factors, including personality traits, specifically impact individuals' psychological reactions and behaviors in response to COVID-19.

Personality traits are among the important psychological vulnerability factors that influence the way any given individual reacts to a viral outbreak, including COVID-19 (Carvalho, Pianowski, & Gonçalves, 2020; Somma et al., 2021; Zajenkowski, Jonason, Leniarska, & Kozakiewicz, 2020). Personality traits might affect how individuals handle COVID-19-related anxiety. Studies have consistently demonstrated the association between personality traits and various types of preventive health behaviors (Abdelrahman, 2020). Some

of these traits stand out as important predictors of COVID-19-related anxiety and compliance with governmental policies regarding COVID-19 (Zajenkowski et al., 2020). For instance, neuroticism is a trait that may capture people's tendency to avoid risk (Jonason & Sherman, 2020) and, therefore, may lead neurotic individuals to comply with policies that might increase their sense of safety (Zajenkowski et al., 2020). Individuals who score high on neuroticism are more worried about their health and engage in health anxiety-related behaviors (Van Dijk et al., 2016). However, agreeable individuals care about others and are generally prosocial in nature (Wilkowski, Robinson, & Meier, 2006). Therefore, those who are agreeable may simply comply because doing so protects others. Conscientious individuals try to avoid germs and live an organized life (McRae & Costa, 2008). Therefore, individuals who score high on agreeableness and consciousness are more inclined to engage in behaviors that helps them avoid infectious diseases (Mortensen, Becker, Ackerman, Neuberg, & Kenrick, 2010).

While personality is considered as one of the most important factors in contributing individuals' reactions to the pandemic (Abdelrahman, 2020; Gupta & Parimal, 2020; Jeronimus, 2020), few studies have been conducted that have evaluated the relationship between personality traits and anxiety symptoms caused by COVID-19 in affected countries. The most obvious way of understanding the role of personality traits in accounting for individual differences in reactions to COVID-19-related anxiety is through the lens of the Big Five personality traits (Zajenkowski et al., 2020). Additionally, newer models of personality pathology that focus on pathological traits might better explain this relationship in the context of pandemics.

The DSM-5 alternative model for personality pathology focuses on maladaptive variants of the five domains of the extensively validated Big Five personality model, sometimes called the Five-Factor Model (FFM) of personality (Krueger, Derringer, Markon, Watson, & Skodol, 2012; Thomas et al., 2013), and includes negative affectivity (i.e., neuroticism or the

tendency to experience an array of negative emotions), detachment (i.e., characterized by introversion, social isolation, and anhedonia), antagonism (i.e., aggressive tendencies accompanied by assertions of dominance and grandiosity), disinhibition (i.e., impulsivity and sensation seeking), and psychoticism (i.e., a disconnection from reality and a tendency for illogical thought patterns). Research concerning the DSM-5 alternative model is still relatively new but it appears to be promising because it assesses extreme or atypical levels of basic personality traits that are not captured by other psychometric instruments.

Despite the growing interest in the DSM-5 alternative model of personality pathology, no study so far explored their role in individuals' psychological reactions during the COVID-19 pandemic. To the present authors' knowledge, no previous study has explored the relationships between DSM-5 pathological personality domains and COVID-19-related anxiety symptoms. Therefore, further research in this field is warranted. The present study focused on the DSM-5 alternative model for personality and investigated the relationships between DSM-5 pathological personality domains and symptoms of COVID-19-related anxiety. The study also investigated the power of DSM-5 pathological personality domains in predicting the COVID-19-related anxiety symptoms.

Method

Participants and procedure

Participants in the present study comprised Iranian mixed college students and community adults (N= 612; 59.2% female; range =18-51 years). Given that individuals were quarantining at home to minimize the spread of COVID-19, participants were recruited through an online data portal from March 27 to April 20, 2020. Through this online portal, community individuals and college students can voluntarily participate in social science studies or services based on their interest after reviewing the project title and description. No remunerative rewards or course credits were given for participation. Participants with access to the internet

could participate in the study. For all participants, the inclusion criteria were: (i) being aged 18 years or above; and (ii) having no missing values in the online survey. The survey was hosted on the *Google Forms* platform and was sent via e-mails, WhatsApp, Telegram, and Instagram (the most popular social media platforms in Iran). On receiving and clicking the web-link, the participants were directed to the information concerning the study and informed consent. At the beginning of the survey, participants were told that their data were anonymous and confidential and that participation was voluntary. All participants provided informed consent. Participants were told that that they could withdraw from the study at any time. After agreeing to take part in the survey, the participants provided socio-demographic details (i.e., age, gender, education, marital status and monthly income). Participants were also asked to rate their physical health status and state any history of chronic medical illness (e.g., cardiovascular, kidney diseases, diabetes, digestive system, lung and respiratory tract). Following this, a set of several questions in two sections appeared sequentially (see 'Measures' below).

Measures

The Personality Inventory for DSM-5-Brief Form (PID-5-BF)

The brief form of the PID-5 developed by Krueger et al. (2012) is a 25-item self-report scale that assesses five domains of pathological personality traits (negative affect, detachment, antagonism, disinhibition, and psychoticism) for adults aged 18 years and older on a four-point Likert-style scale ranging from 0 (*very false or often false*) to 3 (*very true or often true*). The PID-5-BF has a sound psychometric properties with excellent reliability and validity. Krueger et al. (2012) Reported internal consistency of this questionnaire between .75 and .95 (average alpha .86). In the present study, the internal consistency was good for all subscales: negative affect (α = .71), detachment (α = .73), antagonism (α = .68), disinhibition (α = .74), psychoticism (α = .70), and for the total score (α = .89).

Coronavirus Disease Anxiety Scale (CDAS)

The CDAS (Alipour, Ghadami, Alipor, & Abdollahzadeh, 2020) is an 18-item self-report scale with two subscales corresponding to anxiety symptoms caused by the outbreak of COVID-19 comprising psychological symptoms (Items 1 to 9) and physical symptoms (Items 10 to 18). The subscales are summed to create a total CDAS score, reflecting overall COVID-19-related anxiety. Items are responded to on a four-point Likert scale (0 = never, 1 = sometimes, 2 = often, and 3 = always), with scores ranging from 0 to 54, with higher scores indicating higher levels of COVID-19-related anxiety. Internal consistencies of the total scale and subscales were very good to excellent: psychological symptoms (α = .87), physical symptoms (α = .88), and for the total scale (α= .91).

Ethics

All study procedures were approved by the research team's University Research Ethics Committee. The procedures of the study complied with the Declaration of Helsinki regarding research on human participants. The ethical conditions of participation including voluntary participation, privacy, anonymity and confidentiality were explained to the participants.

Statistical analysis

Statistical analyses were conducted using IBM Statistical Package for the Social Sciences (SPSS) for Windows, Version 24 (SPSS Inc., New York, USA). An analysis of descriptive statistics was conducted to illustrate the demographic and other selected characteristics of the participants. Descriptive statistics were reported as a number (%) for categorical variables and mean (and SD) for continuous variables concerning participants' backgrounds. One-way ANOVAs and independent *t*-tests were used in order to investigate the associations between

sample socio-demographic characteristics and anxiety. Pearson correlations and multiple linear regression were conducted to examine the relationships between pathological personality traits and COVID-19-related anxiety. Data met the ANOVA and regression analysis linear assumptions. Normal distributions and homogeneity of variance were confirmed by the Kolmogorov-Smirnov and Levin's tests, respectively ($p< 0.05$).

Results

Descriptive findings

As shown in Table 1, most of the sample were female, single, and younger than 34 years. Only 3.8% were over the age of 40 years. All participants had an academic degree, and 60.9% of the sample had a medium income and 23.4% had a good income.

Table 1 here

Table 2 shows the differences between the demographic groups in relation to COVID-19-related anxiety. As seen in the table, there were no differences between males and females, different age groups, or individuals with different education in relation to COVID-19-related anxiety. COVID-19-related anxiety was higher among married participants than among single participants.

Table 2 here

Relationships between DSM-5 pathological personality domains and COVID-19-related anxiety symptoms

Pearson correlation analysis showed that there was a positive and significant relationship between all of DSM-5 pathological personality domains and COVID-19-related anxiety (all *p*-

values ≤0.01). Significant findings were found for both psychological and physical symptoms (see Table 3).

Table 3 here

Predictive power of COVID-19-related anxiety symptoms based on DSM-5 pathological personality domains

The enter-multiple linear regression method was used to calculate the predictive power of the independent variables (see Table 4). The analysis indicated that DSM-5 pathological personality domains explained 21% of the variance in COVID-19-related anxiety. Based on standardized coefficients, negative affect had the greatest role in COVID-19-related anxiety (β=.335). Based on the standardized coefficients, only disinhibition was removed from the model.

Table 4 here

Discussion

Since the COVID-19 outbreak, individuals in the public have shown different anxiety-related reactions (Asmundson & Taylor, 2020a). Several vulnerability factors may play a role in individuals' psychological reactions in response to the COVID-19 pandemic. Among other factors, individual personality traits have been shown to contribute to the development of specific mental health conditions, and as such should be examined as being at-risk markers for corona-related anxiety symptoms (Jeronimus, 2020).

The present study investigated the relationships between DSM-5 pathological personality traits and COVID-19-related anxiety symptoms. The results demonstrated that there was a positive and significant relationship between all of DSM-5 pathological personality domains and COVID-19-related anxiety symptoms and was significant among both

psychological and physical symptoms of anxiety. The research also evaluated to what extent DSM-5 pathological personality domains are involved in COVID-19-related anxiety symptoms. The results of the regression analysis found that pathological personality traits explained 21% of COVID-19-related anxiety variance. Examination of the standardized coefficients found that the PID-5 negative affect domain had the main role in COVID-19-related anxiety. Therefore, this domain (i.e., neuroticism) appeared to predict higher levels of COVID-19-related anxiety symptoms.

Considering that PID-5 domains reflect maladaptive variants of FFM dimensions (Krueger et al., 2012), these findings concur with the evidence that neuroticism is relevant personality dimension in the development of anxiety symptoms (Kotov et al., 2017). Furthermore, the higher levels of negative affect (i.e., the tendency to experience frequent and intense negative emotions) reported by individuals with COVID-19-related anxiety symptoms appears to be consistent with the fact that negative affect is significantly involved in explaining the development and maintenance of more general anxiety symptoms and related conditions (Watson, Clark, & Carey, 1988). Looking at the significant (albeit modest) association between PID-5 negative affect domain and COVID-19-related anxiety symptoms, this finding is in accordance with the large amount of empirical data demonstrating that neuroticism is a marker of anxiety-related conditions (Barlow, Ellard, Sauer-Zavala, Bullis, & Carl, 2014; Eysenck, 1991; Jylhä & Isometsä, 2006; Paulus, Vanwoerden, Norton, & Sharp, 2016; Sauer-Zavala, Wilner, & Barlow, 2017).

One possible explanation for the results is that individuals who are neurotic and have a tendency to experience high levels of a wide range of negative emotions (e.g., anxiety, depression, guilt/ shame, worry, anger) are more likely to avoid from these negative internal emotions and suppress them. This in turn may have negative effects on the immune system and increase the chance of being infected by COVID-19. Many data have been accumulated on the

close interaction between the immune and nervous systems. The influence of the central nervous system on activity of the immune system via the hypothalamic–pituitary–adrenal axis and autonomic system are beyond doubt (Dunlop & Wong, 2019; Padgett & Glaser, 2003; Tsigos & Chrousos, 2002). One characteristic nature of infectious disease compared with other conditions is anxiety. Anxiety may amplify the damage of the disease itself. Anxiety is directly associated with the transmission rate of infectious disease and its morbidity and mortality (Ahorsu et al., 2020). The pandemic brought not only the risk of death from the viral infection but also unbearable psychological pressure to some individuals in the affected countries (Duan & Zhu, 2020; Xiao, Zhang, Kong, Li, & Yang, 2020).

On the other hand, high levels of negative affect could indirectly impact probability for additional clinical issues associated with COVID-19. It is known that higher levels of stress and anxiety impair cognitive functioning (Banjongrewadee et al., 2020; McEwen & Sapolsky, 1995). During the COVID-19 pandemic, there have been reports of hospitals being flooded with "worried well" patients who mistakenly believed that their benign coughs or fevers were indications of pandemic influenza (Taylor, 2019). It is likely these "worried well" patients misinterpret their bodily sensations as signs of potential infection with COVID-19. In this regard, it has also been reported that a few individuals with increased COVID-19-related anxiety have committed suicide because they thought they were infected, even though autopsies showed they were not (e.g., Goyal et al, 2020; (Mamun & Griffiths, 2020). Data from recent studies have shown that COVID-19 is having a profound psychological impact (Asmundson & Taylor, 2020b; Huang & Zhao, 2020; Satici et al., 2020). It is vitally important to understand the psychosocial impact of COVID-19 and to identify evidence-based ways of addressing these issues. The COVID-19 pandemic is associated with high global anxiety in affected countries (Taylor & Asmundson, 2020). Previous studies have shown that these anxiety symptoms are more likely to occur among individuals younger than 35 years and those

who are more anxious and spend too much time focusing on the epidemic (Huang & Zhao, 2020). Consistent with previous findings, the present study found that age and pathological personality traits may be potential risk factors for the psychological problems among the general public. Younger participants (< 35 years) with higher rates of negative affectivity were more likely to report anxiety symptoms during COVID-19 pandemic than older participants (≥ 35 years). These results were similar to those of a previous study in Taiwan during the SARS outbreak (Su et al., 2007) and in China during COVID-19 pandemic (Huang & Zhao, 2020).

Although it is still an early stage of the COVID-19 pandemic, a rapidly growing body of research among individuals' responses to the virus is emerging (Harper, Satchell, Fido, & Latzman, 2020). Much remains to be learned about the best ways of reducing coronaphobia and infection-related fears and anxiety symptoms. Pathological personality traits (i.e., negative affect/neuroticism) might affect how individuals handle COVID-19-related anxiety. In the meantime, basic knowledge of how high levels of negative affect impact individuals psychologically as it relates to strategies for containing and mitigating viral spread is important for all decision-makers, health authorities, and healthcare professionals. This needs to be communicated to the general public in an effort to curb maladaptive or irresponsible decisions that may negatively impact these efforts. Nevertheless, as countries worldwide implement strategies to reduce the transmission rate of COVID-19, they should also introduce policies and programs concerning individual anxiety. With the information on how individuals fear COVID-19, healthcare providers can design further appropriate programs to help minimize fear and consequent anxiety. Screen-and-treat approaches for COVID-19-related anxiety could be implemented, in conjunction with community based interventions for both infection-related fears and coronaphobia (e.g., psychoeducational materials) (Taylor, 2019; Taylor & Asmundson, 2020).

Limitations and implications

The results of the present study must be viewed within the context of specific limitations. Using self-report scales, a self-selected modestly sized sample with a bias towards females, and web-based cross-sectional design may all limit the generalizability of the findings. However, despite these limitations, the results are relevant and add to the evidence base in characterizing the role of pathological personality traits in psychological reactions to the viral outbreak. Even though the results showed a correlation between individuals with COVID-19-related anxiety symptoms and pathological personality traits future studies among larger samples should replicate and expand the study.

Overall, findings from the present study show that one of the variables that appears to predict the symptoms of anxiety in a viral outbreak is pathological personality traits. Although existing literature indicates a range of potential psychological vulnerability factors, individual personality traits have continued to receive increased empirical support in relation to psychological reactions to epidemics and pandemics. The present study adds to the literature concerning individual differences in domains of personality in response to pandemic situations. The findings suggest that pathological personality traits, particularly negative affectivity/neuroticism can be predictors in the symptoms of anxiety in a viral outbreak. These novel findings add empirical data to the growing literature on individual differences in domains of personality in response to pandemic situations.

The findings have the potential to enrich extant theoretical models and could have important implications for the prevention, and treatment of anxiety symptoms in a viral outbreak. Given the high correlation between pathological dimensions of personality, particularly negative affectivity/neuroticism, and COVID-19-related anxiety symptoms, an enhanced understanding of how negative affectivity could be implemented has implications for the prevention and treatment of anxiety symptoms in pandemic situations. Given these findings, mental health clinicians working with individuals with symptoms of anxiety in a viral

outbreak could include some focus on pathological personality traits, particularly negative affectivity. The clinical implications of negative affectivity as an underlying personality vulnerability factor in anxiety disorders have received considerable attention in the treatment of anxiety disorders literature in recent years.

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Conflicting Interests

The authors declare that they have no conflict of interest.

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Table 1: Demographic characteristics of participants (N = 612).

Variable	n (%)
Gender	
Female	362 (59.2)
Male	250 (40.8)
Marital status	
Single	456 (74.5)
Married	156 (25.5)
Age	
18-22	202 (33.0)
23-27	208 (34.0)
28-33	118 (19.3)
34-39	61 (10.0)
Over 40	23 (3.8)
Education Level	
Associate	61 (10.0)
Bachelor	310 (50.7)
MSc	165 (27.0)
PhD	76 (12.4)
Family fix income	
Yes	373 (60.9)
No	239 (39.1)
Family limit income	
Poor	196 (32.0)
Moderate	273 (44.6)
Good	143 (23.4)
Anxiety academic activities	
Yes	178 (29.1)
Rather	250 (40.8)
No	184 (30.1)
Affected relatives	
Yes	96 (15.7)
No	516 (84.3)
Symptoms Disease	
Yes	106 (17.3)
No	506 (82.7)
Disease Background	
Yes	504 (82.4)
No	108 (17.6)

Table 2: COVID-19-related anxiety in different groups and differences between them (N= 612)

	COVID-19-related anxiety score (SD)	F-value	*p*-value
Gender		.000	1.000
Female	14.46 (9.28)		
Male	14.46 (8.97)		
Marital status		-2.71	.007
Single	13.87 (9.01)		
Married	16.17 (9.36)		
Age		.99	.411
18-22	202 (13.70)		
23-27	208 (14.32)		
28-33	118 (15.40)		
34-39	61 (15.77)		
Over 40	23 (14.13)		
Education Level		.20	.896
Associate	14.57 (8.21)		
Bachelor	14.71 (9.39)		
MSc	14.09 (9.29)		
PhD	14.14 (8.68)		
Family fix income		-1.17	.239
Yes	14.11 (8.71)		
No	15.00 (9.79)		
Family limit income		6.86	0.001
Poor	13.34 (9.34)		
Moderate	15.97 (9.43)		
Good	13.11 (7.86)		
Anxiety academic activities		26.76	<0.001
Yes	18.19 (10.08)		
Rather	13.98 (8.24)		
No	11.51 (8.12)		
Affected relatives		2.55	0.011
Yes	16.64 (9.77)		
No	14.05 (8.98)		
Symptoms Disease		2.75	0.006
Yes	16.67 (9.16)		
No	14.00 (9.08)		
Disease Background		-2.48	0.013
Yes	14.02 (8.83)		
No	16.44 (10.37)		

Table 3: Means, standard deviations, and correlations among the study variables (N=612)

Variables	Mean	SD	1	2	3	4	5	6	7	8
1. Negative affect	4.91	3.07	-							
2. Detachment	4.83	3.23	0.45**	-						
3. Antagonism	3.62	2.64	0.50**	0.43**	-					
4. Disinhibition	3.89	2.93	0.49*	0.43**	0.46**	-				
5. Psychoticism	4.14	2.91	0.57**	0.51**	0.55**	0.50**	-			
6. Psychological symptoms	10.42	5.50	0.40**	0.14**	0.26**	0.19**	0.26**	-		
7. Physical symptoms	4.03	4.73	0.36**	0.17**	0.34**	0.28**	0.34**	0.59**	-	
8. COVID-19-related anxiety	14.46	9.15	0.43**	0.17**	0.33**	0.26**	0.33**	0.91**	0.87**	-

$p<0.01$** $p<0.05$; *

Table 4: Multiple linear regression analysis for predicting COVID-19-related anxiety

Model	*β*	*t*	*P*	F	R	R^2
Constant		10.677	.001	33.477	.465	.216
Negative Affect	.335	7.066	.001			
Detachment	-.106	-2.415	.016			
Antagonism	.143	3.081	.002			
Disinhibition	.028	0.615	.539			
Psychoticism	.104	2.086	.037			

Note: β= standardized coefficient; dependent variable was COVID-19-related anxiety