Pakistan Journal of Psychology, June 2022, 53, 1, 85-101

HEALTH-RELATED ANXIETY, GENERALIZED ANXIETY, OBSESSIVE COMPULSIVE TENDENCIES, AND COVID-19 ANXIETY AMONG VACCINATED AND NON-VACCINATED ADULTS DURING PANDEMIC

Qasir Abbas[*], Mafia Shahzadi
Government College University, Faisalabad-Pakistan
Saba Ehsan
Lahore Leads University, Lahore, Pakistan
Maryam Shahzadi & Razma Mazhar
Government College Women University, Faisalabad-Pakistan

ABSTRACT

The objectives of the present study were two-folded: first, to examine the predictive association of health-related anxiety with generalized anxiety, obsessive compulsive tendencies and COVID-19 anxiety; second, to examine the differences between vaccinated and non-vaccinated adults on health-related anxiety, generalized anxiety, obsessive compulsive tendencies and COVID-19 anxiety. A purposive sample of 350 adults falling between ages of 25-55 years (M_{age} = 21.58, SD= 2.45) were administered Health Anxiety Inventory, Yale-Brown Obsessive-Compulsive Scale, Generalized Anxiety Disorders Scale and Coronavirus Anxiety Scale. Results of linear regression analysis reveal health-related anxiety as significant predictor of generalized anxiety, obsessive compulsive tendencies and COVID-19 anxiety. Further, independent t-test reveals that vaccinated adults scored significantly lower than non-vaccinated adults on health-related anxiety, obsessive compulsive tendencies, generalized anxiety and COVID anxiety. The implications and future directions are proposed.

Keywords: *Health-Related Concerns, Excessive Worries, Obsessed Tendencies, Coronavirus Anxiety, Vaccination Era*

[*] Correspondence Address: Qasir Abbas, PhD; Assistant Professor, Department of Applied Psychology, Government College University Faisalabad, Main Campus, Faisalabad, Pakistan E-mail: qasirabbas47@yahoo.com; drqasirabbas@gcuf.edu.pk

INTRODUCTION

The COVID-19 was initially identified in China, Wuhan city in 2019, and then there was a quick outbreak worldwide (Kang et al., 2020). The fast spread of COVID-19 in Italy, Spain, and Germany created a pandemic, and weeks later, the situation worsened in the United States and then in India (World Health Organization, 2020b). Up till December 17, 2021, 273 million individuals were diagnosed with COVID-19, with 5 million deaths and 245 million recoveries. Approximately 1,289,193 cases have been reported in Pakistan, with 28,843 deaths and 1,251,778 recoveries. However, because of the vaccination procedure, the number of cases has greatly decreased, the market and academic institutions are operational, but there is still a potential threat from COVID-19 and the Omicron variety. Pandemic outbreaks badly hit the world's economic growth, education, health, both the physical and mental health (Poudel & Subeddi, 2020; Said & Refaat, 2021; Saladino et al., 2020). The daily increase in COVID-19 cases increased life threats for all of us significantly affecting individuals' mental health (Benatti et al., 2020; Shahbaz et al., 2021; Wu et al., 2021).

During COVID-19, people experienced a different lifestyle, which was quite different from the normal. There were uncertainties among us about the health, economy, and employment which significantly affected the persons' mental health. Psychiatric symptoms increased in pandemic among the general public, such as anxieties (31.9%), depressive (33.7%), and others (29.6%) (Salari et al., 2020). Huang and Zaho (2020) identified anxiety symptoms as 35.1% in China and depressive 20.1%. Similarly, in Span, Rodriguez-Rey et al. (2020) investigated 25% of anxieties and worries, 41% depressive symptoms, and 36% GAD symptoms. The COVID-19 outbreak triggered fears and anxieties among the public (Browning et al., 2021; Mertens et al., 2020). People experienced anxieties, fears, and obsessions (Cunning & Hodes, 2021). Continuous worries and anxieties developed health-related symptoms, i.e., upset stomach, chest pain, trouble thinking, and fear of heart attack (Shevlin et al., 2020). People with medical illnesses perceived more worries during pandemics (Majeed et al., 2021). The COVID-19 is significantly associated with anxiety-related symptoms (Chew et al., 2020; Duan & Zhu, 2020) and corona-related worries (Horesh et al., 2020).

An increase in obsessive-compulsive behaviors during pandemics is also observed. Nissen et al. (2020) investigated 44.6% and 73% obsessive-compulsive tendencies in two samples. Hand-washing and social distancing triggered the fear of contamination which enhanced the COVID-19 anxiety among the public. Another

study's findings reported obsessive-compulsive tendencies to be mild 10%, moderate 47%, and 38% severe symptoms (Storch et al., 2021). Further, research data reported approximately 54% of participants perceived obsessive-compulsive symptoms (Tanir et al., 2020).

Health-realted anxiety was one of the psychological issue that affected a large number of people (Mirzabeigi et al., 2021). Health anxiety generally is defined as a high level of worry about one's health and a preoccupation with getting or developing a major illness typically in response to misperceptions of physical or psychological symptoms (World Health Organization, 2016). In context of pandemic health-related anxiety is referred to as excessive attention to physical symptoms, such as those brought on by viral infections (such as fever, coughing, and aching muscles), and a persistent predisposition to interpret them as symptoms of a serious medical condition (Asmundson & Taylor, 2020).

The cognitive behavioural model of health anxiety (Warwick & Salkoski, 1990; Salkoski et al., 2003) postulates cognitive and safety seeking behavioral factors that influence the development and maintenance of health anxiety. Cognitive factors include overestimating the likelihood of having or developing a serious illness, overestimating the severity of a disease, and incorrectly interpreting physical symptoms as signs of a dangerous illness. Safety seeking behaviors include: avoidance of circumstances or stimuli that they feel will make them anxious such as hospitals, sick people, reminders of illness, thought suppression, and distraction or engagement in excessive health-related actions, such as monitoring their bodies for symptoms of illness, information seeking and reassurance seeking. The the model of health anxiety conceptualizes threat interpretations as fundamental to the experience of anxiety. These interpretations result in anxious sensations, physical responses, and safety-related behaviors.

People with elevated health anxiety levels wrongly believe that the physical changes they experience during a pandemic of viral infections like COVID-19 are signs of infection (Behjati et a., 2019). This makes them more anxious and has an impact on how they act. Persons frequently acquired a lot of information about the virus from the media during the pandemic, which is likely to increase their level of health anxiety (Mertens et al., 2020). In a study, 43.8% of Iranians reported having mild to high and 19.1% reported having severe health-realted anxiety during COVID-19 (Mirzabeigi et al., 2021). Akbari et al. (2021) and Yalcin et al. (2022) reported a link between fear of COVID-19 and health related anxiety. In addition, elevated rate of health-anxiety are also reported in healthcare workers population

(Ardakani et al., 2021; Behjati et al., 2021; Kaveh et al., 2021). Few studies have documented the elevated rates of health-realted anxiety to be associated with other psychological outcomes such as anxiety, depression, panic, obsessive thoughts and compulsive behaviours (Asmundson & Taylor, 2020; Landi et al., 2020).

Vaccination has fast become a key element of the current COVID-19 pandemic prevention plan (World Health Organization, 2020). A significant decrease in the prevalence of COVID-19 in vaccinated population is seen (Huang & Zhao, 2020). Studies have documented a decrease in psychological effects in vaccinated population. For instance, in the nationally representative Understanding America Study (UAS) conducted on 8,003 adults revealed that the first dosage of the COVID vaccination resulted in decreased mental distress (Perez-Arce et al., 2021). Another study done in China found that level of stress significantly decreased following vaccination (Zheng et al., 2021). Additionally, a research of 1,779 persons in Germany between January 1 and January 11, 2021 revealed that vaccination against COVID-19 may be correlated with COVID-19-related anxiety, and fears of infection and health-related consequences (Bendau et al., 2021). A study conducted in Nowshera city of Khyber Pakhtunkhwa province of Pakistan on a sample of patients with psychiatric disorder revealed significant differences between vaccinated and non-vaccinated patients on depression and anxiety. The vaccinated population reported significant lower rates of depression and anxiety than non-vaccinated population.

To sum up, the review of literature implies a significant association between vaccination status and psychological symptoms. In addition, health-realted anxiety is documented to be linked to other psychological outcomes. However, such studies are in real dearth particularly in Pakistani cultural context as most of the available studies are conducted on Western Population. Hence, the present study is an endeavor to fill in the gap in literature and is an endeavor:

1. To examine the predictive association of health-related anxiety with generalized anxiety, obsessive-compulsive tendencies and COVID-19 anxiety.

2. To examine the differences between vaccinated and non-vaccinated adults on the variable of health-related anxiety, generalized anxiety, obsessive-compulsive tendencies and COVID-19 anxiety.

METHOD

Participants

The study sample size of 365 adults was calculated using software (G-Power, version 3.1.9.4) with error (α =0.01) and effect size (d=0.40) at .95 level of confidence (Faul et al., 2009). We targeted more than 400 participants and 365 participants met the given below study inclusion-exclusion criteria. The sample was collected from the general public using a purposive sample technique.The total sample was divided into two groups i.e. vaccinated (n=173) and non-vaccinated (n=192). Participants' age range was between 25-55 years with a mean age of 21.58 (±SD=2.45). The vaccinated participants mean age was 22.05 (±SD=2.80), whereas non-cvaccinated participants mean age was 21.16 (±SD=2.01) respectively.

Inclusion and exclusion criteria

- Only those participants were taken who have completed the vaccination and those who are never vaccinated.
- Participants who had any kind of comorbid condition were excluded.
- Participants with physical and intellectual disability were also excluded.

Measures

Demographic Form:

Demographic form was used to obtain participants' personal information.

Short Health Anxiety Inventory

The 18-item Short Health Anxiety Inventory (SHAI) is used to gauge one's level of health anxiety (Salkovskis et al., 2002). The SHAI has three subscales: illness likelihood, illness severity, and body vigilance. The total score range is 0-54, and each item is scored as *Never=0* to *Most of the time=3*. The SHAI is reported to have good to excellent internal consistency (.74 to .96) (Alberts et al., 2013).

Generalized Anxiety Disorders Scale

The Generalized Anxiety Disorders Scale (GAD) comprises seven items designed to screen anxiety symptoms severity (Spitzer et al., 2006). Each question's

reponse category of *not at all, a few days, more than half the days,* and *nearly every day* receives a score of 0, 1, 2, or 3, respectively. The individual scores for each of the 7 questions are added to determine the final score. The cut-off points for mild, moderate, and severe anxiety are, respectively, 5, 10, and 15. Authors reported internal consistency value of .92 and test-retest reliability of .83 indicating sound psychometric properties.

Yale-Brown Obsessive-Compulsive Scale:

The Yale-Brown Obsessive-Compulsive Scale (YBOCS) comprises 10 items, and each item is designed to symptoms severity related to obsessions and compulsions (Woody et al., 1995). The scale combines two subscales that screen the severity of the symptoms related to "obsessions" and "compulsions." All statements are rated on 5-point Likert-type scales. Scale internal consistency is calculated as .86 with inter-rater reliability .97 and test-retest .64 indicating sound psychometric properties.

Coronavirus Anxiety Scale

The Coronavirus Anxiety Scale (CAS) is comprised of 5 items, which are designed to assess the anxiety related to COVID-19 (Lee et al., 2020a). Each statement is scored from *"Not at all=0"* to *"Nearly every day over the past two weeks=4".* Using a cut score of >9 the CAS successfully distinguishes between people who have dysfunctional anxiety and those who don't. Lee et al. (2020b) reported excellent internal consistency (α = .92).

Procedure

This cross-sectional study was conducted at the Government College University Faisalabad (GCUF), Pakistan, from November 2020 to October 2021. The forma approval was sought from the Institutional Review Board (IRB), Government College University Faisalabad. The data was collected using online survey from the community, public organizations, and various hospitals. Participants were given a brief explanation of the study's purpose and provided enough information to make an informed decision to participate in the study including the right to withdraw participation and assurance of confidentiality ot the collected data.

Statistical Analysis

After data completion, data was scrutinized and prepared for statistical analysis. The *t*-test and linear regression anlaysis were used to analyze the studies proposed assupmtions using Statistical Package for Social Sciences (version 26).

RESULTS

Table 1
Demographic Characteristics of Sample (N=365)

Variables	*f*	*%*
Gender		
Male	187	51.20
Female	178	48.80
Marital Status		
Unmarried	168	46.02
Married	135	36.99
Divorced /Separated	062	16.99
Education		
Matric	101	27.67
Intermediate	80	21.93
Under graduation	90	24.65
Graduation	94	25.75
Family System		
Nuclear	162	44.38
Joint	203	56.62
Status of COVID Vaccination		
Vaccinated	173	47.40
Non-Vaccinated	192	52.60
	M	*SD*
Vaccinated Sample Age	22.05	2.80
Non-Vaccinated Sample Age	21.16	2.01

Table 2
Health-Related Anxiety as Predictor of Generalized Anxiety, Obsessive Compulsive Tendencies and COVID-19 Anxiety (N=365)

Outcome Variables	*B*	*SE*	*β*	R^2	*F*	*Sig.*
Generalized Anxiety	.61	.04	.63	.39	235.79	.00*
Obsessive Compulsive Tendencies	.62	.05	.58	.34	186.31	.00*
COVID-19 Anxiety	.37	.03	.61	.37	211.97	.00*

*$p < .05$, *df =1,363*

Table 3
Independent t-test showing differences between Vaccinated and Non-vaccinated Adults on the Variables of Health-Related Anxiety, Generalized Anxiety, Obsessive Compulsive Tendencies and COVID-19 Anxiety

	Vaccinated (*n*=173)		Non-Vaccinated (*n*=192)			
Variable	*M*	*SD*	*M*	*SD*	*t*	*P*
Health-related Anxiety	10.95	7.45	16.23	10.10	-5.63	.00*
Illness Likelihood	6.46	4.83	9.54	5.62	-5.57	.00*
Illness Severity	1.87	2.05	3.86	2.95	-7.39	.00*
Body Vigilance	3.52	2.42	4.54	2.62	-3.86	.00*
Generalized Anxiety	10.05	8.57	15.94	8.40	-6.51	.00*
Obsessive-Compulsive Symptoms	8.46	9.50	12.37	9.72	-3.87	.00*
Obsessive Symptoms	3.88	4.48	7.43	5.82	-6.46	.00*
Compulsive Symptoms	3.17	3.53	6.62	5.97	-6.63	.00*
COVID-19 Anxiety	4.62	5.52	6.56	5.45	-3.38	.00*

*$p<.05$

DISCUSSION

The purpose of the study was first to examine the predictive association of health-related anxiety with generalized anxiety, obsessive compulsive tendencies and COVID-19 anxiety. Second, to examine the differences between vaccinated and non-vaccinated adults on health-related anxiety, generalized anxiety, obsessive compulsive tendencies and covid-19 anxiety. The results of linear regression analyses pertaining to first objective (Table 2) reveal that health anxiety explained 39% variance in the scores generalized anxiety and the model is significant suggesting health-related a significant predictor of generalized anxiety. Likewise, health-related anxiety accounted for 34% variance in the scores of obsessive compulsive tendencies and 37% in the scores of COVID-19 anxiety and both models are significant. Thus, health related anxiety significantly predicted obsessive compulsive tendencies and COVID-19 anxiety in adults.

These findings are consistent with the findings from previous studies (Landi et al., 2020; Pieh et al., 2020). Individuals having health anxiety were seen more obsessed about the health and they showed compulsive behavior in term of excessive hand-washing and unnecessary social distancing (Abba-Aji et al., 2020). In pandemic situation, people became more conscious about health and they perceived higher level of health anxiety which triggered coronavirus anxiety (Sauer et al., 2020). Similarly, health anxiety provoked the excessive worries and generalized anxieties among public (Asmundson & Taylor, 2020). Health concerns were significantly associated with virus anxiety (Jungmann & Witthöft, 2020). Health anxiety significantly provoked the anxiety and stress symptoms in pandemic situations (Mautong et al., 2021). The findings of this study support the postulations Cognitive behavioral model of health anxiety (Salkoski et a., 2003; Warwick & Salkoski, 1990) and suggest the scientific basis to understand the COVID anxiety and the role of health anxiety, and other anxiety related issues.

The results regarding second objective of the study reveal significant differences between vaccinated and non-vaccinated adults on the variable of health-related anxiety, generalized anxiety, obsessive compulsive tendencies and COVID-19 anxiety (Table 3). The vaccinated adults has scored significantly low on all mental health conditions compared to non-vaccinated adults. These findings are consistent with the previous findings (Pandey et al., 2021). Vaccination process reduced threatening situation and mental health problems and enhanced the chance of recovery process (Perez-Arce et al., 2021). Emotional and behavioral problems are reduced after vaccination process and this a relief to the individuals worldwide

among all communities (Madison et al., 2021). Initially, most of the expression circulated among the general public that vaccination is not fruitful but the studies proved that Vaccination is effective and particularly Pfizer, BioNTech, and Moderna vaccinees have reported 95% efficacy rate (Mahase, 2020).

In conclusion, findings of the present study suggest the role of health-related anxieties with other psychological outcomes i.e. generalized anxiety, obsessive-compulsive tendencies, and COVID anxiety. Further, findings suggest vaccination may have a positive influence on improving psychological effects of COVID-19. These findings have implication for public health doctors and practitioners as well as for government and policymakers. By understanding and addressing the general public's change in psychological impacts following the receipt of the COVID-19 vaccine, they may be able to better inform people who are reluctant or resistant to vaccination and boost their trust in the ongoing vaccination campaign. The findings of the present study must be interpreted with caution considering the following limitations. The sample size included only 25 to 55 years old educated adults who were either vaccinated or non-vaccinated. Hence, this study is unable to provide information on how children and the elderly responded to COVID-19 anxiety and associated mental health issues during a pandemic.

REFERENCES

Abba-Aji, A., Li, D., Hrabok, M., Shalaby, R., Gusnowski, A., Vuong, W., Surood, S., Nkire, N., Li, X.-M., Greenshaw, A. J., & Agyapong, V. I. O. (2020). COVID-19 pandemic and mental health: Prevalence and correlates of new-onset obsessive-compulsive symptoms in a Canadian Province. *International Journal of Environmental Research and Public Health*, *17*(19), 6986. https://doi.org/10.3390/ijerph17196986

Abasi, I., Sohrabzadeh Fard, A., Farzin, A., Lee, S., Masjedi Arani, A., et al. (2021). Psychometric properties of Coronavirus Anxiety Scale in Iranian pPopulation. *Iranian Journal of Psychiatry Behavior Science*, *15*(4), e112707. doi: 10.5812/ijpbs.112707.

Abramowitz, J.S., Deacon, B.J., Valentiner, D.P. (2007). The Short Health Anxiety Inventory: Psychometric properties and construct validity in a non-clinical sample. *Cognit Ther Res.*,*31*(6),871-883. doi: 10.1007/s10608-006-9058-1.

Akbari, M., Spada. M. M., Nikčević, A.V., & Zamani E. (2021). The relationship between fear of COVID-19 and health anxiety among families with COVID-19 infected: The mediating role of metacognitions, intolerance of uncertainty, and emotion regulation. *Clinical Psychology & Psychotherapy*, 28(6), 1354-1366.

Ardakani, M. B., Aghamolaei, T., Azad, M. H., Ahmadi, M. S., Zare, F., Khademian, M. et al. (2021). Evaluation of health anxiety in healthcare workers during coronavirus disease 2019 (COVID-19) pandemic. *Disease and Diagnosis, 10*(2), 56-59.

Asmundson, G. J., & Taylor, S. (2020). How health anxiety influences responses to viral outbreaks like COVID-19: What all decision-makers, health authorities, and health care professionals need to know. *Journal of Anxiety Disorder, 71,* 102211–102211. doi: 10.1016/j.janxdis.2020.102211

Bendau, A., Plag, J., Petzold, M. B., Ströhle, A. (2021). COVID-19 vaccine hesitancy and related fears and anxiety. *International Immunopharmacology, 97,* 107724. doi: 10.1016/j.intimp.2021.107724

Benatti, B., Albert, U., Maina, G., Fiorillo, A., Celebre, L., Girone, N., Fineberg, N., Bramante, S., Rigardetto, S., & Dell'Osso, B. (2020). What happened to patients with obsessive compulsive disorder during the COVID-19 Pandemic? A multicentre report from tertiary clinics in Northern Italy. *Frontiers in Psychiatry, 11,* 720. https://doi.org/10.3389/fpsyt.2020.00720

Browning, M. H. E. M., Larson, L. R., Sharaievska, I., Rigolon, A., McAnirlin, O., Mullenbach, L., Cloutier, S., Vu, T. M., Thomsen, J., Reigner, N., Metcalf, E. C., D'Antonio, A., Helbich, M., Bratman, G. N., & Alvarez, H. O. (2021). Psychological impacts from COVID-19 among university students: Risk factors across seven states in the United States. *PLOS ONE*, *16*(1), e0245327. https://doi.org/10.1371/journal.pone.0245327

Chew, N. W. S., Lee, G. K. H., Tan, B. Y. Q., Jing, M., Goh, Y., Ngiam, N. J. H., Yeo, L. L. L., Ahmad, A., Ahmed Khan, F., Napolean Shanmugam, G., Sharma, A. K., Komalkumar, R. N., Meenakshi, P. V., Shah, K., Patel, B., Chan, B. P. L., Sunny, S., Chandra, B., Ong, J. J. Y., … Sharma, V. K. (2020). A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during

COVID-19 outbreak. *Brain, Behavior, and Immunity*, *88*, 559–565. https://doi.org/10.1016/j.bbi.2020.04.049

Cunning, C., & Hodes, M. (2021). The COVID-19 pandemic and obsessive–compulsive disorder in young people: Systematic review. *Clinical Child Psychology and Psychiatry*, 13591045211028168. https://doi.org/10.1177/13591045211028169

Darvishi, E., Golestan, S., Demehri, F., & Jamalnia, S. (2020). A cross-sectional study on cognitive errors and Obsessive-Compulsive Disorders among young people during the outbreak of Coronavirus Disease 2019. *Activitas Nervosa Superior*, *62*(4), 137–142. https://doi.org/10.1007/s41470-020-00077-x

Duan, L., & Zhu, G. (2020). Psychological interventions for people affected by the COVID-19 epidemic. *The Lancet Psychiatry*, *7*(4), 300–302. https://doi.org/10.1016/S2215-0366(20)30073-0

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149–1160.

Horesh, D., Kapel Lev-Ari, R., & Hasson-Ohayon, I. (2020). Risk factors for psychological distress during the COVID-19 pandemic in Israel: Loneliness, age, gender, and health status play an important role. *British Journal of Health Psychology*, *25*(4), 925-933. doi: 10.1111/bjhp.12455

Huang, Y., & Zhao, N. (2020). Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: A web-based cross-sectional survey. *Psychiatry Research*, *288*, 112954.

Islam, Md. S., Ferdous, Most. Z., & Potenza, M. N. (2020). Panic and generalized anxiety during the COVID-19 pandemic among Bangladeshi people: An online pilot survey early in the outbreak. *Journal of Affective Disorders*, *276*, 30–37. https://doi.org/10.1016/j.jad.2020.06.049

Jungmann, S. M., & Witthöft, M. (2020). Health anxiety, cyberchondria, and coping in the current COVID-19 pandemic: Which factors are related to

coronavirus anxiety? *Journal of Anxiety Disorders*, *73*, 102239. https://doi.org/10.1016/j.janxdis.2020.102239

Kang, L., Ma, S., Chen, M., Yang, J., Wang, Y., Li, R., Yao, L., Bai, H., Cai, Z., Xiang Yang, B., Hu, S., Zhang, K., Wang, G., Ma, C., & Liu, Z. (2020). Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain, Behavior, and Immunity*, *87*, 11–17. https://doi.org/10.1016/j.bbi.2020.03.028

Kaveh, M., Hajaliakbari, V., Davari-Tanha, F., Varaei, S., Ghajarzadeh, M., Feizabad, E., Ashraf, M. A., & Kaveh, Z. (2021). Anxiety levels among female iranian health care workers during the COVID-19 surge: A Cross-sectional study. *Journal of Obstetrics, Gynecology and Cancer Research, 7*(2), 69-76. doi: 10.30699/jogcr.7.2.69

Kuroda, Y., Iwasa, H., Orui, M., Moriyama, N., Nakayama, C., & Yasumura, S. (2018). Association between health literacy and radiation anxiety among residents after a nuclear accident: Comparison between evacuated and non-evacuated areas. *International Journal of Environmental Research and Public Health, 15*(7), 1463. doi: 10.3390/ijerph15071463

Landi, G., Pakenham, K. I., Boccolini, G., Grandi, S., & Tossani, E. (2020). Health anxiety and mental health outcome during COVID-19 Lockdown in Italy: The mediating and moderating roles of psychological flexibility. *Frontier in Psychology, 11,* 2195. doi: 10.3389/fpsyg.2020.02195.

Lee, S. A. (2020a). Coronavirus Anxiety Scale: A brief mental health screener for COVID-19 related anxiety. *Death Studies*, *44*(7), 393-401. https://doi.org/10.1080/07481187.2020.1748481

Lee, S. A., & Mathis, A. A., Jobe, M. C., Pappalardo, E. A. (2020b). Clinically significant fear and anxiety of COVID-19: A psychometric examination of the Coronavirus Anxiety Scale. *Psychiatry Research, 290,*113112. doi: 10.1016/j.psychres.2020.113112.

Madison, A. A., Shrout, M. R., Renna, M. E., & Kiecolt-Glaser, J. K. (2021). Psychological and Behavioral Predictors of Vaccine Efficacy:

Considerations for COVID-19. *Perspectives on Psychological Science*, *16*(2), 191–203. https://doi.org/10.1177/1745691621989243

Mahase, E. (2020). Covid-19: Moderna vaccine is nearly 95% effective, trial involving high risk and elderly people shows. *BMJ*, *371*, m4471. https://doi.org/10.1136/bmj.m4471

Majeed, S., Schwaiger, E. M., Nazim, A., & Samuel, I. S. (2021). The psychological impact of COVID-19 among pakistani adults in Lahore. *Frontiers in Public Health*, *9*, 578366. https://doi.org/10.3389/fpubh.2021.578366

Mautong, H., Gallardo-Rumbea, J. A., Alvarado-Villa, G. E., Fernández-Cadena, J. C., Andrade-Molina, D., Orellana-Román, C. E., & Cherrez-Ojeda, I. (2021). Assessment of depression, anxiety and stress levels in the Ecuadorian general population during social isolation due to the COVID-19 outbreak: A cross-sectional study. *BMC Psychiatry*, *21*(1), 212. https://doi.org/10.1186/s12888-021-03214-1

McLean, C. P., Asnaani, A., Litz, B. T., & Hofmann, S. G. (2011). Gender differences in anxiety disorders: Prevalence, course of illness, comorbidity and burden of illness. *Journal of Psychiatric Research*, *45*(8), 1027–1035. https://doi.org/10.1016/j.jpsychires.2011.03.006

Mertens, G., Gerritsen, L., Duijndam, S., Salemink, E., & Engelhard, I. M. (2020). Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020. *Journal of Anxiety Disorders*, *74*, 102258. https://doi.org/10.1016/j.janxdis.2020.102258

Mirzabeigi, A. R., Agha, M. H. P., Sayadi, A. R., Safarian, M., Parand, A. S. (2021). Assessing health anxiety among healthcare providers of COVID-19 patients from March to May 2020, Rafsanjan County, Iran. *Journal of Occupational Health Epidemiology*, *10*, 4405.

Nearchou, F., Flinn, C., Niland, R., Subramaniam, S. S., & Hennessy, E. (2020). Exploring the impact of COVID-19 on mental health outcomes in children and adolescents: A systematic review. *International Journal of Environmental Research and Public Health*, *17*(22), 8479. https://doi.org/10.3390/ijerph17228479

Nissen, J. B., Højgaard, D., & Thomsen, P. H. (2020). The immediate effect of COVID-19 pandemic on children and adolescents with obsessive compulsive disorder. *BMC Psychiatry*, *20*(1), 1–10.

Pandey, K., Thurman, M., Johnson, S. D., Acharya, A., Johnston, M., Klug, E. A., Olwenyi, O. A., Rajaiah, R., & Byrareddy, S. N. (2021). Mental health issues during and after COVID-19 vaccine era. *Brain Research Bulletin*, *176*, 161–173. https://doi.org/10.1016/j.brainresbull.2021.08.012

Perez-Arce, F., Angrisani, M., Bennett, D., Darling, J., Kapteyn, A., & Thomas, K. (2021). COVID-19 vaccines and mental distress. *PLOS ONE*, *16*(9), e0256406. https://doi.org/10.1371/journal.pone.0256406

Pérez, S., Masegoso, A., & Hernández-Espeso, N. (2021). Levels and variables associated with psychological distress during confinement due to the coronavirus pandemic in a community sample of Spanish adults. *Clinical Psychology & Psychotherapy*, *28*(3), 606-614. https://doi.org/10.1002/cpp.2523

Pieh, C., Budimir, S., & Probst, T. (2020). The effect of age, gender, income, work, and physical activity on mental health during coronavirus disease (COVID-19) lockdown in Austria. *Journal of Psychosomatic Research*, *136*, 110186. https://doi.org/10.1016/j.jpsychores.2020.110186

Poudel, K., & Subedi, P. (2020). Impact of COVID-19 pandemic on socioeconomic and mental health aspects in Nepal. *The International Journal of Social Psychiatry*, *66*(8), 748–755. https://doi.org/10.1177/0020764020942247

Rodríguez-Rey, R., Garrido-Hernansaiz, H., & Collado, S. (2020). Psychological impact and associated factors during the initial stage of the Coronavirus (COVID-19) pandemic among the general population in Spain. *Frontiers in Psychology*, *11*, 1540. https://doi.org/10.3389/fpsyg.2020.01540

Said, E., & Refaat, G. (2021). How did the COVID-19 pandemic affect higher education learning experience? An empirical investigation of learners' academic performance at a university in a developing country. *Advances in Human-Computer Interaction*, *2021*, e6649524. https://doi.org/10.1155/2021/6649524

Saladino, V., Algeri, D., & Auriemma, V. (2020). The psychological and social impact of Covid-19: New Perspectives of well-being. *Frontiers in Psychology, 11*, 2550. https://doi.org/10.3389/fpsyg.2020.577684

Salari, N., Hosseinian-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M., Rasoulpoor, S., & Khaledi-Paveh, B. (2020). Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: A systematic review and meta-analysis. *Globalization and Health*, *16*(1), 57. https://doi.org/10.1186/s12992-020-00589-w

Salkovskis, P. M., Warwick, H. M. C., Deale, A. C. (2003). Cognitive-behavioral treatment for severe and persistent health anxiety (Hypochondriasis). *Brief Treatment and Crisis Intervention, 3,* 353-367.

Sauer, K. S., Jungmann, S. M., & Witthöft, M. (2020). Emotional and behavioral consequences of the COVID-19 pandemic: The role of health anxiety, intolerance of uncertainty, and distress *in tolerance*. *International Journal of Environmental Research and Public Health*, *17*(19), 7241. https://doi.org/10.3390/ijerph17197241

Shahbaz, S., Ashraf, M. Z., Zakar, R., & Fischer, F. (2021). Psychosocial, emotional and professional challenges faced by female healthcare professionals during the COVID-19 outbreak in Lahore, Pakistan: A qualitative study. *BMC Women's Health*, *21*(1), 197. https://doi.org/10.1186/s12905-021-01344-y

Shevlin, M., Nolan, E., Owczarek, M., McBride, O., Murphy, J., Gibson Miller, J., Hartman, T. K., Levita, L., Mason, L., & Martinez, A. P. (2020). COVID-19-related anxiety predicts somatic symptoms in the UK population. *British Journal of Health Psychology*, *25*(4), 875–882.

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, *166*(10), 1092–1097. https://doi.org/10.1001/archinte.166.10.1092

Storch, E. A., Sheu, J. C., Guzick, A. G., Schneider, S. C., Cepeda, S. L., Rombado, B. R., Gupta, R., Hoch, C. T., & Goodman, W. K. (2021). Impact of the COVID-19 pandemic on exposure and response prevention outcomes in

adults and youth with obsessive-compulsive disorder. *Psychiatry Research, 295*, 113597.

Tanir, Y., Karayagmurlu, A., Kaya, İ., Kaynar, T. B., Türkmen, G., Dambasan, B. N., Meral, Y., & Coşkun, M. (2020). Exacerbation of obsessive compulsive disorder symptoms in children and adolescents during COVID-19 pandemic. *Psychiatry Research, 293*, 113363.

Warwick H. M., Salkovskis P. M. (1990). Hypochondriasis. *Behaviour Research and Therapy, 28*(2), 105-117. https://doi.org/10.1016/0005-7967(90)90023-c

Woody, S. R., Steketee, G., & Chambless, D. L. (1995). Reliability and validity of the Yale-Brown Obsessive-Compulsive Scale. *Behaviour Research and Therapy, 33*(5), 597–605. https://doi.org/10.1016/0005-7967(94)00076-v

World Health Organization. (2016). *International statistical classification of diseases and related health problems* (10th ed.). World Health Organization.

World Health Organization. (2020). *Strategy to achieve global COVID-19 vaccination by-mid-2022.* https://www.who.int/publications/m/item/strategy-to-achieve-global-covid-19-vaccination-by-mid-2022

Wu, X., Nazari, N., & Griffiths, M. D. (2021). Using Fear and Anxiety Related to COVID-19 to Predict cyberchondria: Cross-sectional survey study. *Journal of Medical Internet Research, 23*(6), e26285. https://doi.org/10.2196/26285

Yalçın, İ., Boysan, M., Eşkisu, M., & Cam, Z. (2022). Health anxiety model of cyberchondria, fears, obsessions, sleep quality, and negative affect during COVID-19. *Current Psychology.* https://doi.org/10.1007/s12144-022-02987-2

Zheng, Y. B., Sun, J., Liu, L., Zhao, Y. M., Yan, W., Yuan, K., et al. (2021). COVID-19 vaccine-related psychological stress among general public in China. *Frontier in Psychiatry, 12*, 774504. doi: 10.3389/fpsyt.2021.774504