

does pandemic anxiety have effects on emotionality, government actions, and interpretation of the pandemic?

Turkish Online Journal of Qualitative Inquiry (TOJQI)
Volume 13, Issue 1, January 2022: 564-580

Research Article

Does Pandemic Anxiety have Effects on Emotionality, Compliance with Government Actions, and Interpretation of the Pandemic?

**Maher M. Abu-Hilal¹, Jihad Alaedein², Faisal Abdelfattah³, Adnan Atoum⁴, Hamzeh Dodeen⁵,
and Muna Al Bahrani⁶**

Correspondence: Faisal Abdelfattah, Department of Psychology, College of Education, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia, P.O Box: 1982, Saudi Arabia. faabdelfattah@iau.edu.sa

^{1,6}: College of Education, Sultan Qaboos University, Oman. ²: College of Education, Hashemite University, Jordan. ³: College of Education, Imam Abdulrahman Bin Faisal University, Saudi Arabia. ⁴: College of Education, Yarmouk University, Jordan. ⁵: United Arab Emirates University, UAE.

Abstract

The aim of this study is to predict how anxiety during the COVID-19 pandemic affects empathy, compliance with government actions, safety precautions, and precautions, and conspiracy beliefs, among adult Arab citizens. Responses were recruited electronically through a self-report online questionnaire designed electronically on the Jotform website during the period from April 25 to May 17, 2020. Respondents were 1302 (62% females) citizens from several Arab countries and Arab residents in some countries around the world with an age range between 22 and 60 years. Consistent with previous research, we found a positive association between anxiety and conspiracy thinking. The more anxious Arab males and females were the more they endorsed conspiracy theory. The results revealed a stronger association between anxiety and conspiracy thinking among males than females. Also, in line with previous research, adherence to official measures is negatively associated with conspiracy thinking, but only for males. Males who showed weak readiness to obey official measures (guidelines), believed more in conspiracy theory.

Pandemic anxiety generated stronger feelings of empathy toward others and more respect for safety precautions. Empathic responding, in turn, was a strong predictor of compliance to official measures whereas, anxiety was unrelated to compliance. The findings are useful in terms of providing evidence for designing interventions and implementing preventative approaches to mitigate the psychopathological consequences of COVID-19.

Keywords: COVID-19 pandemic, Anxiety, Emotionality, Government Actions, Interpretation of the Pandemic.

1. Introduction

The abundance of research on the effect of pandemics on mental health has opened the door to understanding people's emotional reactions when experiencing events perceived as life-threatening such as the current outbreak of the novel Coronavirus pandemic (COVID-19). COVID-19 has been declared “a public health emergency of international concern (PHEIC)” by the World Health Organization (WHO, 2020a). The COVID-19 pandemic has affected all aspects of life including trade, social life, human mental and psychological health. The United Nations (2020) warns of a global mental health crisis due to COVID-19 pandemic. Fear, uncertainty, and suspicion about tomorrow spread all over the world. Great human losses have been reported in big countries in America, Europe, Asia, and Africa. Specifically, in the Middle East, thousands of cases were reported in Egypt and other neighboring countries. In fact, during a period of pandemics, many situations can be overwhelming, not only related directly to the primary disease, but also related to the measures needed to be taken to combat it, and its aftermath.

During the outbreak of the previous pandemics such as severe acute respiratory syndrome (SARS), specific procedures and rules such as quarantine, travel restrictions, and the promotion of individual protection behaviors such as frequent hand washing, wearing face masks, stay-at-home, or avoiding public gatherings were the measures of choice. The success of these measures to reduce the pandemic depended largely on personality traits, cognitive style (Barron et al., 2014), a complex voluntary process of information processing, trust, and adherence to government rules.

1.1. Anxiety, Empathy in the Context of the COVID-19 Pandemic

Compared to other pandemics, COVID-19 has increased anxiety and concerns about health (Temsah et al., 2020). During this unprecedented pandemic, people may develop adaptive ways of coping with their fear such as building meaningful relationships and leaving a positive legacy (Menzies, & Menzies, 2020). Several models (e.g., health behavior model –HBM-, wishful thinking, empathic responding) have been proposed to explain behavior during the time of stress and anxiety. Models of stress and coping provide a reasonable framework to explain how anxiety related to health and coping behaviors are related (DeLongis & O’Brien, 1990; Lee-Baggley et al., 2004).

Empathic responding, according to Lee-Baggley et al. (2004), has recently begun to be an area of research. Individuals engaging in empathic responding try to understand what others are experiencing and offer support and assistance. Empathic responding may benefit the recipients of these efforts as well as the providers (O’Brien & DeLongis, 1997). These benefits can come as an improved psychological well-being, better physical health, and relationships satisfaction.

Previous research on SARS and West Nile Virus has indicated that empathic responding has been associated with higher perceived threat during a pandemic as well as the implementation of recommended health precautions (King et al., 2016; Kowalski et al., 2020). For example, Lee-Baggley et al. (2004) found that those who reported engagement in empathic responding as a response to the threat of SARS were more likely to report empathizing with other people at high risk for SARS, and

does pandemic anxiety have effects on emotionality, government actions, and interpretation of the pandemic?

to report engaging in effective health behaviors such as using disinfectants and hand washing. Also, Puterman et al. (2009) found that the empathic behavior in response to the risk of the virulent agent of SARS and West Nile Virus was related to taking recommended and effective health precautions.

In India, King et al. (2016) examined the role of empathic responding and the endorsement of specific health precautions during the 2009/2010 H1N1 pandemic and reported that individuals who responded to the threat of H1N1 with greater empathy were more likely to endorse recommended health behaviors (e.g., vaccination, hand washing, and disinfectant use). Furthermore, previous research tested a hypothesis that individuals who overcome pandemic anxiety through empathic responding may show greater appreciation of the work of health and social workers (e.g., Eisenberg & Miller 1987; Eisenberg et al., 2010). O'Brien and DeLongis (1996) indicated that anxiety due to stressful events led to more empathy and sensitivity toward others. As such, empathy has been established as a key determinant of pro-social behavior which facilitates more caring and supportive interactions among people (King et al., 2016). These results confirm the important role of empathic responding in coping with the anxiety and stress linked to the threat of infectious diseases such as COVID-19.

1.2. Pandemic Anxiety, Compliance with Government Actions, and Conspiracy Theory Beliefs about COVID-19 Pandemic

Countries across the globe including Arab countries, have taken various steps to contain and delay the spread of the virus within their borders, with differing degrees of success. Governments throughout the Arab World have enacted some of the world's strictest measures, including suspending passenger flights and imposing curfews on citizens to put brakes on the number of cases of COVID-19. These governments deployed security forces on the roads in order to increase the feeling of safety. They enforced lockdown, quarantine infected people, and closed some areas to limit the spread of infection. These health-related procedures may not succeed unless people comply with and appreciate them as steps for their safety and health. This issue seems very complicated especially when citizens are facing harsh emotions of fear, anxiety, uncertainty, loss of jobs, and great changes in their daily life.

In the current context of the global pandemic (COVID-19), some research has looked at the role of personality-based variables in predicting compliance with virus-mitigating behaviors (e.g., social distancing, hand hygiene), and the propensity to engage in behaviors that enhance a delay in the transmission of the virus (e.g., hand washing, avoiding large gatherings, and compliance to government measures). For instance, Harper et al. (2020) examined the role of personality-based variables in predicting public health compliance in the COVID-19 pandemic and found that the only predictor of positive behavior change (e.g., social distancing, improved hand hygiene) was anxiety or fear of COVID-19. Furthermore, a rapid review of the evidence into compliance with quarantine advice during pandemics recently reported that appealing to altruistic motivations to comply with distancing instructions appeared to maintain motivation to social distance from others over an extended period of time (Brooks et al. 2020). The relation between personality and attitudes towards official health measures were supported by Zettler et al. (2020) who reported that the HEXACO personality domains of emotionality (characterized by exaggerated levels of anxiety, fear, and emotional reactivity) were associated with higher level of acceptance of government-mandated personal restrictions to fight the COVID-19 pandemic.

Conspiracy beliefs are thought to arise from a range of factors. One conceptualization has been that conspiracy beliefs stem from specific underlying psychopathological traits that make a person more likely to develop erroneous beliefs (Georgiou et al., 2020). The conspiracy beliefs can be defined as unsubstantiated and implausible beliefs that involve the role of a malevolent force and powerful groups. These groups are seen to manipulate and monitor the world in plotting major events. While other explanations maybe more probable, such beliefs can have negative implications for the society. Apart from leading to distrust in political institutions, they can also lead to resistance to important medical and public health interventions (Georgiou et al., 2020). Such beliefs can have negative health and social consequences (Swami et al., 2014, 2016).

It has been found that heightened levels of anxiety prompt a person to find meaning, order, or controllability for otherwise ambiguous events (Swami et al., 2014). The relation between anxiety and conspiracy beliefs has been supported in some previous work (e.g., Cassese et al., 2020; Srol et al., 2021). Sallam et al. (2020) found that the higher level of anxiety about COVID-19 among Jordanian participants was associated with a stronger belief that the disease was part of a global conspiracy. Sallam et al.'s results also revealed that females and low-income individuals were more likely to think that the disease was linked to a conspiracy. On a Slovakian sample (n = 783) shortly after the first cases of COVID-19 were identified, Srol et al. (2021) found that higher awareness of the risks and lower confidence in the institutions were associated with feelings of anxiety and lack of control. Anxiety and lack of control, in turn, predicted an increase in conspiracy beliefs about coronavirus. Georgiou et al. (2020) surveyed 660 adults in relation to conspiracy beliefs and attitudes towards government responses and found that COVID-19 conspiracy beliefs correlated with negative attitudes towards government responses. Chen et al. (2020) surveyed 252 healthcare workers in Ecuador who showed two different views of the origin of COVID-19. One group believed the virus was originated intentionally in the lab, whereas the other group was not sure about the origin of the virus. The first group was more likely to have distress and anxiety disorders and lower levels of job and life satisfactions. In sum, conspiracy theorists assert that believing in a conspiracy is an attempt to reduce anxiety by creating meaning and developing simple causal interpretations of complex and threatening events (Franks et al., 2013).

As for the relations between demographic variables and conspiracy beliefs, Freeman et al. (2020) found that those who adopt conspiracy beliefs were more likely to be males, unmarried, unemployed, and less educated. Also, conspiracy beliefs were associated with lower income, and weaker social networks. Similar relationships were found in a large sample of South African adolescents who were surveyed about their interpretation of HIV/AIDS epidemic (Hogg et al., 2017). Recently, Cassese et al. (2020) evaluated gender differences in COVID-19 conspiracy beliefs and found, contrary to Sallam et al. (2020), that women were significantly less likely than men to endorse COVID-19 conspiracy interpretation. They explained that the gender difference was partially due to differences in learned helplessness and conspiratorial thinking that were more prevalent among men.

Our review of previous research on COVID-19 has shown that most research has been conducted in the United States, China, and European countries. Rarely, however, studies have been conducted in the Middle East (Abdelfattah et al., 2021; Sallam et al., 2020; Temsah et al., 2020). This current research attempts to bridge this gap in empirical research. It explores relations among pandemic anxiety, empathic responses, compliance to official measures, and conspiracy beliefs about COVID-

does pandemic anxiety have effects on emotionality, government actions, and interpretation of the pandemic?

19 among Arab citizens. Better understanding of these variables may enable mental health services to better target and assist individuals at risk of being affected psychologically during the ongoing COVID-19 pandemic.

Consistent with previous research, these variables are of paramount importance in understanding emotions and behavior during pandemics (e.g., Azlan et al., 2020; Georgiou et al., 2020; Lee-Baggley et al., 2004; Puterman et al., 2009; Sallam et al., 2020; Swami et al., 2016; Zhong et al., 2020). The associations among these variables are considered crucial at times of health distress and crises. It enables us identify and reach people with mental health and well-being issues during the pandemic (Chen et al., 2020).

1.3. Objectives of the Study

Despite the rapid increase in the number of publications regarding COVID-19, some personality variables that affect coping with the stressful conditions enforced by this dreadful disease have not been clearly explored, especially in the non-Western context. Given what has been mentioned, the aim of this study is to predict how COVID-19 pandemic anxiety affects empathy, government actions, safety precautions, and conspiracy beliefs, among adult Arab citizens.

1.4. Hypotheses

Hypothesis 1. Consistent with models of stress and coping with a disease, it is expected that anxiety related to Coronovirus-19 would be associated with an increased likelihood of empathic responding and attitudes toward workers helping efforts.

Hypothesis 2. Consistent with health belief models that underscore the importance of perceived threat in engaging in health-promoting behaviors, it is expected that the Coronavirus-19's anxiety would be associated with an increased likelihood of endorsing the recommended safety health precautions.

Hypothesis 3. It is expected that higher scores on anxiety, empathic responding, and valuation would also be associated with an increased likelihood of endorsing recommended official government actions, and safety precaution behaviors.

Hypothesis 4. Based on the pandemic-as-stressor model, we expect a synergistic relationship between (1) the Coronavirus-19 Anxiety related to the perceived fearful threat and, a (5) belief in conspiracy theory, will affect the other relations with (2) the empathic response, in predicting (3) attitudes toward government actions, and (4) a measure of precautionary safety, health behaviors. Specifically, it was expected that the link between belief in conspiracy theory (5) and anxiety during the Coronavirus-19, that assumed to be variant across gender. Moreover, this relationship would be associated with an increased likelihood of endorsing recommended precautionary safety, and health behaviors when empathic responding scores are also high.

2. Methodology

2.1. Participants

The sample consisted of Arab adults (N =1302) who were recruited through online means such as social media and electronic emails. Table 1 shows the distribution of the sample according to some

demographic variables. The sample represented several Arab countries (e.g., Jordan: 39%; Oman: 22%; Saudi Arabia: 10.4%; Palestine: 8.4%; United Arab Emirates: 8%; Iraq: 2.3%; Morocco: 1.5% and Bahrain: 1%). The other Arab countries were represented by less than 1% each. Some Arab respondents were residing in non-Arab countries such as the USA, Europe, South America, New Zealand, and Canada (< 3%).

Table 1
Demographic Variables, Count and Percent

Gender	Frequency	Percent
Female	803	761.
Male	499	38.3
Total	1302	100.0
Age group		
< 18	18	1.4
18-22	224	17.2
23-30	220	16.9
31-40	315	224.
41-50	301	23.1
51-60	178	13.7
> 60	46	3.5
Total	1302	100.0
Marital status		
Widow	12	9.
Single	449	34.5
Married	801	61.5
Total	1262	96.9
Missing	40	3.1
Total	1302	100.0
Hosing		
Apartment	525	40.3
Villa	247	19.0
House	530	40.7
Total	1302	100.0
Work		
Unemployed	253	19.4
Student	320	24.6
Business	78	6.0
Public service	793	29.1
Private sector	272	.920
Total	1302	010C
Locale		
Village	289	22.2
City	1013	77.8
Total	1302	100.0

2.2. Instruments

A specifically tailored questionnaire which consisted of a few subscales was developed. Five of the subscales were used in this study. The first subscale (COVID-19 anxiety) measured the anxiety of respondents due to COVID-19 and consisted of nine items. The items of this subscale were formatted on a five-point Likert-type scale and anchored from 1 'very few times' to 5 'very many times'. The

does pandemic anxiety have effects on emotionality, government actions, and interpretation of the pandemic?

second subscale (empathy) measured the empathic responses with others including health and security workers (9 items). The third subscale (compliance to official measures) had five items measuring compliance with government measures. The fourth subscale (safety precautions) measured adherence to health and safety conditions such as social distancing, wearing facemasks, and washing hands. Three items were used in the subscale. Finally, the fifth subscale (conspiracy beliefs) intended to measure if people perceived the pandemic was caused by a conspiracy. Three items were used in this subscale. Two items were summed to make an indicator. The other two items were individual items. The range of responses for the latter four subscales was from 1 ‘*strongly disagree*’ to 5 ‘*strongly agree*’. Table 2 shows the constructs, examples of items and the Cronbach's alpha coefficients.

Table 2
The Construct of the Study, Sample items and Cronbach's Alpha

Construct	Sample items	Number of items	α
Anxiety	<i>I become increasingly anxious when I know the pandemic may last longer</i>	9	.89
Empathy	<i>Corona-pandemic has made me appreciate the work of health workers.</i>	9	.88
Compliance to official measures	<i>Decisions to lockdown and confinement were effective in reducing the outbreak of the virus.</i>	5	.71
Attitudes toward safety precautions	<i>Wearing masks should be only for medical staff.</i>	3	.79
Conspiracy beliefs	<i>The outbreak of coronavirus was plotted by international powers to gain money from vaccine and medicine’.</i>	4	.61

2.3. Procedure

The respondents in the current study were recruited and surveyed through a self-report online questionnaire designed electronically on the Jotform website (<https://eu.jotform.com>), and participants from several Arab countries were invited to respond to it, through invitation messages on universities platforms, social media, and advertisements. The data collection process continued from April 25, 2020, to May 17, 2020. The questionnaire included an affirmation of the voluntary participation, the participant has the right to withdraw at any moment, and the data of this study would be used for scientific research purposes only. The introduction also included instructions for choosing a single response deemed appropriate to describe the condition in the current circumstances. The questionnaire ended with a message of thanks to the respondents for completing the questionnaire successfully.

2.4. Data Analysis

Confirmatory factor analysis (CFA) and structural equation modeling (SEM) were used to test the proposed model, using AMOS-21 software. The model had one exogenous construct and four endogenous constructs. The COVID-19 anxiety was posited to predict each of the endogenous latent constructs. In testing invariance across gender, we were interested in whether there was support for the invariance of factor loadings (weak invariance), factor variances-covariances, path coefficients, and measurement residuals.

The maximum likelihood method was used to analyze the data. Because the χ^2 statistic is widely known to be sensitive to sample size (Cheung & Rensvold, 2002), model fit was evaluated using the

comparative fit index (CFI), and the root mean square error of approximation (RMSEA) that have been recognized to be least affected by sample size. According to Hu and Bentler (1999), an acceptable and good model fit is indicated by CFI values above .90 and .95, respectively; and when the RMSEA value is ideally below .06. The most commonly used goodness-of-fit index for invariance tests has been the difference in chi-square ($\Delta\chi^2$). However, due to its sensitivity to sample size, Cheung and Rensvold (2002) proposed Δ CFI or Δ TLI as robust statistics for testing between-group invariance models when the sample size is large. They suggested that a value of Δ CFI (Δ TLI) smaller than or equal to .01 shows that the null hypothesis of invariance should not be rejected. Therefore, we adopted Cheung and Rensvold's suggestions and used Δ TLI as the statistics indicator for the invariance tests.

3. Findings

EFA and CFA were performed to test the structure of the subscales (measurement model). From EFA factor scores and zero-order correlations were computed. Table 2 shows the correlation coefficients among the constructs for males (above diagonal) and females (below diagonal). The matrix shows similar coefficients for males and females, except for the correlation between pandemic anxiety and conspiracy. The correlation was larger for males than females. Also, we correlated these constructs with gender. Gender was significantly related to anxiety, empathy, and adherence to official measures suggesting that females were more anxious, empathic, and adherent to official measures.

Table 3
Correlations among Constructs of the Study. Males above Diagonal, Females below.

Construct	1	2	3	4	5
1. Anxiety	--	.22**	.10*	.14**	.27**
2. Empathy	.21**	--	.49**	-.08	.10*
3. Official measures	.13**	.40**	--	-.10*	-.04
4. Precautions	.11**	.01	-.15**	--	.10*
5. Conspiracy	.14**	.03	.01	.09**	--
6. Gender (female = 0; male = 1)	-.10**	-.15**	-.15**	.05	.01

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

SEM was used to test the relations among the constructs (Figure 1). Table 4 shows the results of the SEM for measurement, structural, and structural paths invariance across gender. We conducted the analysis with complete invariance across gender. All the seven models, except model 7, showed invariant parameters ($\chi^2_{(820)} = 2160.94$, CFI = .903, RMSEA = .035). Factor loadings were substantial and invariant across gender indicating a valid measurement model. They ranged between .38 and .86 with most of loadings above .60.

does pandemic anxiety have effects on emotionality, government actions, and interpretation of the pandemic?

Table 4
Models' Fit Statistics and Invariance across Gender

Model	χ^2	DF	χ^2/DF	CFI	RMSR	RMSEA	ΔCFI	invariance
1. Unconstrained	1641.45	722	2.27	.933	.048	.031	---	---
2. Loadings invariant	1677.78	746	2.25	.932	.048	.031	.001	yes
3. Intercepts invariant	1837.08	775	2.37	.923	.047	.032	.009	yes
4. Structural weights invariant	1859.64	785	2.37	.922	.049	.032	.001	yes
5. Covariances invariant	1863.61	786	2.37	.921	.049	.032	.001	yes
6. Structural residuals invariant	1887.64	790	2.39	.920	.052	.033	.001	yes
7. Measurement residuals invariant	2160.94	825	2.62	.903	.051	.035	.017	No

Note. CFI: Comparative fit index; RMSR: Root mean square residuals; RMSEA: Root mean square error of approximation.

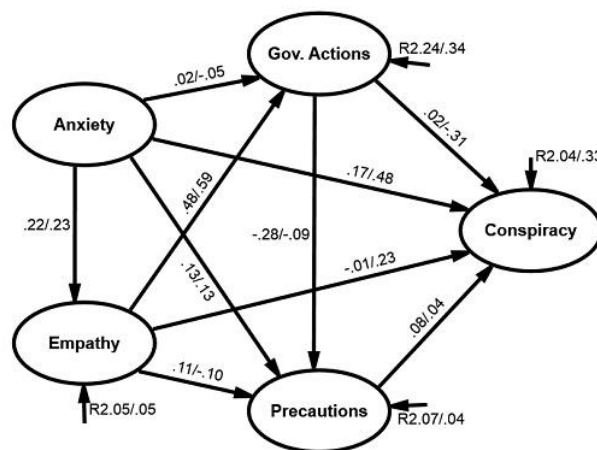


Figure 1.
Structural Model of Relations among COVID-19 Anxiety, Empathy, Government Actions, Safety Precautions and Conspiracy from the Unconstrained Model.
Note. Female first then male; R2: Squared multiple correlation

Table 5 shows the path coefficients for males and females. Pandemic anxiety associated with empathic responses for males and females. Thus, our prediction was supported. The more respondents expressed anxiety, the more they expressed empathic responses. Similarly, anxiety was a predictor of health precautions. That is, the more males and females were anxious of the pandemic, the more they endorsed health precautions. Anxiety was weakly related to compliance with official measures for both males and females. Similarly, safety precautions not associated with conspiracy beliefs for males and females.

Although pandemic anxiety predicted conspiracy beliefs significantly for males and females, the paths were substantially different across gender with males showing stronger association between the two variables. Empathy predicted conspiracy significantly positively for males but the two variables were weakly associated for females. The association of empathy with safety precautions were inconsistent

across gender. Empathy was positively associated with safety precautions for females, but the two variables were weakly related for males.

Concerning the association between compliance to official measures and precautions, the association was inconsistent across gender. Similarly, the association between compliance and conspiracy beliefs was also inconsistent. Whereas compliance to official measures was negatively associated with conspiracy beliefs for males, the two variables were not related for females. In contrast, compliance to official measures was negatively associated with precautions for females, but the two variables were weakly associated for males. All in all, females' empathic responses and compliance to official measures had weak predictions of conspiracy beliefs suggesting weak awareness of conspiracy among females. For females, the model explained a small portion of variance in the conspiracy (4%) as well as the other endogenous constructs. The model seemed to better fit males' than females' responses. Significant portion of variance in compliance to official measures (34%) and conspiracy beliefs (33%) was explained by the constructs of the model.

To test potential mediation among some of the constructs, we utilized path analysis using factor scores. The results of regressing official measures on empathy and anxiety supported full mediation as only empathy was significant predictor of official measures when anxiety was controlled. That is, anxiety had an indirect effect on official measures through empathy for both males and females. We conducted stepwise regression analysis to test potential mediations of anxiety and empathy through official measures with precautions as dependent variable. It turned that no mediation is likely as the anxiety was the stronger predictor of precautions for males. However, for females, official measures in addition to anxiety predicted precautions significantly suggesting partial mediation. We also conducted stepwise regression with all variables predicting conspiracy. Similar to the previous results, anxiety and precautions predicted conspiracy for females and only anxiety predicted conspiracy for males, suggesting no support to mediation. At best, there was a possible partial mediation between official measures and conspiracy only for females.

does pandemic anxiety have effects on emotionality, government actions, and interpretation of the pandemic?

Table 5
Path Coefficients across Gender from Model 1 (Unconstrained Parameters)

IV		DV	Sex	B	SE	CR	β
Anxiety	→	Empathy	Female	.10**	.02	5.44	.22
			Male	.14**	.03	4.40	.23
Anxiety	→	Compliance to measures	Female	.01	.02	.53	.02
			Male	-.03	.03	-1.06	-.05
Anxiety	→	Precautions	Female	.13**	.04	3.15	.13
			Male	.15*	.06	2.43	.13
Anxiety	→	Conspiracy	Female	.11**	.04	2.84	.17
			Male	.45**	.10	4.56	.48
Empathy	→	Compliance to measures	Female	.46**	.05	8.74	.48
			Male	.57**	.07	8.46	.59
Empathy	→	Precautions	Female	.22*	.11	2.06	.11
			Male	-.20	.14	-1.41	-.10
Empathy	→	Conspiracy	Female	-.01	.09	-.13	-.01
			Male	.37*	.18	2.09	.23
Compliance to measures	→	Precautions	Female	-.60**	.12	-4.85	-.28
			Male	-.19	.15	-1.21	-.09
Compliance to measures	→	Conspiracy	Female	.03	.10	.29	.02
			Male	-.51*	.20	-2.55	-.31
Precautions	→	Conspiracy	Female	.05	.04	1.38	.08
			Male	.03	.06	.55	.04

Note. IV: Independent variable; DV: Dependent variable; B: unstandardized beta; SE: Standard error; CR: Critical ratio; β : Standardized beta.
*. $p < .05$, ** $p < .01$

4. Discussion and Conclusion

The study hypothesized that the pandemic anxiety would be associated with an increased likelihood of empathic responses, official measures, endorsing the recommended health precautions, and beliefs of conspiracy theory as a cause of Coronavirus pandemic. The results of the study are consistent with models of stress and coping with a disease (Lazarus, 1999; DeLongis & O'Brien, 1990); and with the HBMs that underscore the importance of perceived threat in engaging in health-promoting behaviors (Glanz & Bishop 2010); however, with varying degrees across gender. The findings of this study provide support to previous findings with coronavirus and other viral threats (Freeman et al., 2020; Lee-Baggley et al., 2004; Marinthe et al., 2020; Srol et al., 2021). Lee-Baggley et al. (2004, p. 10) stated: "One of the most significant effects that any pandemic has had on the public has been a change in health-related behaviors. These changes were multi-faceted and encompassed everything from frequent hand washing and the use of facemasks to complete isolation from the outside world." These changes also include how people understand the pandemic and how they react to its conditions and the surrounding including other individuals and entities (e.g., government, police and health workers).

The findings of this study may give support to the HBM, perceptions of a threat depend on the perceived susceptibility to the disease, and the perceived severity of the consequences of the disease (Rosenstock, 1974; Rosenstock, et al., 1988, Jones et al., 2015). In line with models of HBM (Glanz & Bishop, 2010; Lee-Baggley et al., 2004; Rosenstock, 1974), perceived pandemic anxiety has also been demonstrated as an important predictor of taking health precautions in response to Coronavirus and SARS pandemic as well as endorsing conspiracy theory (Srol et al., 2021).

4.1. Gender Invariance

Our findings support some previous studies regarding gender differences in anxiety, compliance with official measures and conspiracy thinking. For example, with a Chinese population during the COVID-19 pandemic, Huo et al. (2020) found that females were experiencing more severe stress and anxiety symptoms, while males showed better resilience to stress. Also, Mohammadpour et al. (2020), indicated that men were more likely not to observe COVID-19 self-care behaviors. In spite of the scarcity of research in the Arab world regarding gender differences in mental health difficulties during the outbreak of COVID-19 pandemic, a recent study proved the high prevalence of anxiety among Saudi Arabian females during the COVID-19 event (Asdaq et al., 2020). In addition, Jordanian females were more anxious of the pandemic than males (Massad et al., 2020).

In the present study, although females were more anxious, more empathic, and more adherent to official measures than males, the associations among these variables were lower for females than males. This kind of association can be attributed to gender characteristics in the Arab society and probably other societies as well. The attitudes of women are more moderate and less extreme than the attitudes of men. This is evidenced in this study by larger variability of the constructs of this study. Whereas females tend to dwell around the mean, males dispersed away from the mean. In addition, males use blogs, media-sharing sites, social questioning/ answering, and reviews more frequently than females (Huo et al., 2020) and may have created extreme stance concerning issues related to the pandemic. Hence, stronger association ensue as a result. Consistent with previous research (e.g., Freeman et al., 2020; Srol et al., 2021) we found positive association between anxiety and conspiracy thinking. The more anxious Arab males and females were the more they endorsed conspiracy theory. Also, in line with previous research, adherence to official measures negatively associated with conspiracy thinking, but only for males. Males who showed weak readiness to obey official measures (guidelines), believed more in conspiracy theory.

The results concerning gender differences with respect to associations among pertinent constructs in threatening situations have important implications in the Arabic cultural setting. The present study provides the following explanations of the gender differences concerning the associations among the variables of the study. *First*, social media was the main source of updating the COVID-19 related information for males as observed in some research (Huo et al., 2020). These resources are not all honest in their information. Thus, the gender difference in anxiety and conspiracy thinking obtained in this study maybe the result of men spending more time watching news of pandemic that was not all positive. *Second*, the data of this study was gathered at the end of April 2020 -when the new COVID-19 cases were increasing significantly in most Middle East countries. Early evidence suggests that COVID-19 crisis seems to hit men harder than women (Wenham et al., 2020). In addition, these traumatic circumstances were accompanied by great economic distress among male workers and

does pandemic anxiety have effects on emotionality, government actions, and interpretation of the pandemic?

households who are the responsible and care takers which may triggered psychological stress and increased anxiety symptoms among men, and probably resulted in more negative reactions toward government measures and precautions; and consequently, adopting the conspiracy theory (Srol et al., 2021).

With all participants of this study belonging to Arab societies, we may suitably consider “gender” as a cultural trait, and behavior tailored appropriate for men or women, then, the role for men is the breadwinner as a central performance of masculinity. The masculine cultural values of the Arab society distinguish between gender roles. "On the one hand, females in Arab societies are encouraged to be communal, to prioritize their domestic responsibilities and to fulfill their socially-ascribed role as wives and mothers, while males are socialized to pursue their careers and to be financially independent" (Theodoropoulou & Ahmed, 2018, p. 114). In particular, during the pandemic, these norms may give hard time and impact the family role responsibilities, income, work, lifestyle, among males, who lost their jobs with not enough income to cover family life expenses. This may have prevented men from practicing their traditional roles as households and breadwinners. According to Mellstrom (2020), there may be a significant relationship between COVID-19, masculinity, and risk factors. Also, this situation may have raised the conspiracy beliefs that originate partially from anxiety, boredom, and paranoia proneness (Kowalski et al., 2020).

Medically speaking, men carry a larger burden of non-communicable diseases (e.g. strokes, most heart diseases, most cancers, and diabetes), which are risk factors for mortality in patients infected by COVID-19. Men do worse on healthy lifestyles than women (Wenham et al., 2020). It seems that more men have been socialized to hide anxiety and fear in response to COVID-19 (Griffith et al., 2020); however, weak controllability among men may have raised anxiety and showed its effect on rejecting official measures and adopting conspiracy theory (Srol et al., 2021).

4.2. Conclusions and Recommendations

The results revealed a strong association between COVID-19 pandemic anxiety and the pandemic conspiracy thinking among males and females. Results revealed that COVID-19 anxiety stand as the best predictor of health precautions and conspiracy. Anxiety had indirect effect on compliance with official measures. The findings of this study can be effective in providing accurate interventions, such as increasing self-compassion, altruism (Piliavin, 2009), compassion-focused therapy, mindful self-compassion, cultivating compassion training, and cognitively based compassion training (Kirb, 2016) to reduce anxiety and fear of COVID-19 and other possible epidemics in the future. In particular, the findings of this study are considered useful for highlighting the need of designing interventions and implementing preventative approaches to mitigate the psychopathological and passive consequences of COVID-19.

4.3. Limitations and future research

This study has some limitations which affects the generalizability of its findings. First, the study was based on self-report online questionnaire and warrant caution in the generalization of the present results. Moreover, only individuals who had access to the internet were able to participate, in consequence, individuals who did not have internet access, or digitally illiterate in a survey topic may have been underrepresented. It would be of importance to provide longitudinal and experimental data

on how anxiety may be influencing health-related behaviors during pandemics or at least the factors that prevent to undertake such actions. It would also be of importance to investigate whether a pandemic result in a surge of conspiracy beliefs or are they at a relatively similar level irrespective of pandemic traumatic event by pre and post-evaluation.

Funding: The authors have no funding to disclose.

Compliance with Ethical Standards: All procedures followed were in accordance with the ethical standards of the Standing Committee for Research Ethics on Living Creature at Imam Abdulrahman Bin Faisal University and with the 1964 Helsinki Declaration and its later amendments. Informed consent was obtained from all individual adult participants included in the study.

Conflicts of Interest: The authors declare they have no conflict of interest.

References

1. Abdelfattah, F., Abu-Hilal, M., Dodeen, H., Alaedein, J., Al-Bahrani, M., & Atoum, A. (2020). The psychological effects of the Corona pandemic (Covid-19) on the Arab citizen and his responses to it: A cross-sectional study in several Arab countries. *Dirasat: Humanities and Social Sciences*, 48 (1), 44-69.
2. Asdaq, S., Alajlan, S., Mohzari, Y., Asad, M., Alamer, A., Alrashed, A., Nayeem, N., & Nagaraja, S. (2020). COVID-19 and psychological health of female Saudi Arabian population: A cross-sectional study. *Healthcare*, 8(4), 1-10. <https://doi.org/10.3390/healthcare8040542>
3. Azlan, A., Hamzah, M., Sern, T., Ayub, S., & Mohamad, E. (2020). Public knowledge, attitudes, and practices towards COVID-19: A cross-sectional study in Malaysia. *PloS one*, 15(5), e0233668. <https://doi.org/10.1371/journal.pone.0233668>
4. Barron, D., Morgan, K., Towell, T., Altemeyer, B., and Swami, V. (2014). Associations between schizotypy and belief in conspiracist ideation. *Personality and Individual Differences*, 70, 156–159. <http://doi.org/10.1016/j.paid.2014.06.040>
5. Brooks, S., Webster, R., Smith, L., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet*, 395, 912–920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
6. Caplan, G. (1964). *Principles of preventive psychiatry*. New York, NY: Basic Books.
7. Cassese, E., Farhart, C., & Miller, J. (2020). Gender Differences in COVID-19 conspiracy theory beliefs. *Politics & Gender*, 1-10. <https://doi.org/10.1017/S1743923X20000409>
8. Chen, X., Zhang, S., Jahanshahi, A., Alvarez-Risco, A., Dai, H., Li, J., & Ibarra, V. (2020). Belief in conspiracy theory about COVID-19 predicts mental health and well-being: A study of healthcare staff in Ecuador. *JMIR Public Health and Surveillance*, 6(3), e20737. <https://doi.org/10.1101/2020.05.26.20113258>
9. Cheung, G., & Rensvold, R. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5
10. DeLongis, A., & Holtzman, S. (2005). Coping in context: The role of stress, social support, and personality in coping. *Journal of Personality*, 73(6), 1633–1656. <https://doi.org/10.1111/j.1467-6494.2005.00361.x>
11. DeLongis, A., & O'Brien, T. (1990). An interpersonal framework for stress and coping: An application to the families of Alzheimer's patients. In M. Stephens, J. Crowther, S. Hobfoll, and D. Tennenbaum (Eds.), *Stress and coping in later life families* (pp. 221–239). Hemisphere. <https://doi.org/10.4324/9781315803074-13>
12. Eisenberg, N., & Miller, P. (1987). The relation of empathy to prosocial and related behaviors. *Psychological Bulletin*, 101, 91-119. <https://doi.org/10.1037/0033-2909.101.1.91>
13. Eisenberg, N., Eggum, N., & Di Giunta, L. (2010). Empathy-related responding: associations with prosocial behavior, aggression, and intergroup relations. *Social Issues and Policy Review*, 4(1), 143–180. <https://doi.org/10.1111/j.1751-2409.2010.01020.x>

does pandemic anxiety have effects on emotionality, government actions, and interpretation of the pandemic?

14. Franks, B., Bangerter, A., & Bauer, M. (2013). Conspiracy theories as quasi-religious mentality: an integrated account from cognitive science, social representations theory, and frame theory. *Frontiers in Psychology*, 4, 424. <https://doi.org/10.3389/fpsyg.2013.00424>
15. Freeman, D., Waite, F., Rosebrock, L., Petit, A., Causier, C., East, A., Jenner, L., Teale, A., Carr, L., Mulhall, S., Bold, E., & Lambe, S. (2020). Coronavirus conspiracy beliefs, mistrust, and compliance with government guidelines in England. *Psychological Medicine*, 1–13. <https://doi.org/10.1017/S0033291720001890>
16. Georgiou, N., Delfabbro, P., & Balzan, R. (2020). COVID-19-related conspiracy beliefs and their relationship with perceived stress and pre-existing conspiracy beliefs. *Personality and Individual Differences*, 166, 110201. <https://doi.org/10.1016/j.paid.2020.110201>
17. Glanz, K., & Bishop, D. (2010). The role of behavioral science theory in development and implementation of public health interventions. *Annual Review of Public Health*, 31, 399–418. <https://doi.org/10.1146/annurev.publhealth.012809.103604>
18. Griffith, D., Sharma, G., Holliday, C., Enyia, O., Valliere, M., Semlow, A., Stewart, E., & Blumenthal, R. (2020). Men and COVID-19: A biopsychosocial approach to understanding sex differences in mortality and recommendations for practice and policy interventions. *Preventing Chronic Disease*, 17, E63. <https://doi.org/10.5888/pcd17.200247>
19. Harper, C., Satchell, L., Fido, D., & Latzman, R. (2020). Functional Fear Predicts Public Health Compliance in the COVID-19 Pandemic. *International Journal of Mental Health Addiction*. <https://doi.org/10.1007/s11469-020-00281-5>
20. Hogg, R. S., Eyawo, O., Collins, A. B., Zhang, W., Jabbari, S., Hull, M. W., Lima, V. D., Ahmed, T., Kendall, C. E., Althoff, K. N., Justice, A. C., Barrios, R., Shoveller, J., Montaner, J., & Comparative Outcomes and Service Utilization Trends (COAST) study (2017). Health-adjusted life expectancy in HIV-positive and HIV-negative men and women in British Columbia, Canada: a population-based observational cohort study. *The Lancet HIV*, 4(6), e270–e276. [https://doi.org/10.1016/S2352-3018\(17\)30029-2](https://doi.org/10.1016/S2352-3018(17)30029-2)
21. Hou, F., Bi, F., Jiao, R., Luo, D., & Song, K. (2020). Gender differences of depression and anxiety among social media users during the COVID-19 outbreak in China: A cross-sectional study. *BMC Public Health* 20, 1648 (2020). <https://doi.org/10.1186/s12889-020-09738-7>
22. Hu, L.-T., & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
23. Jones, C., Jensen, J., Scherr, C., Brown, N., Christy, K., & Weaver, J. (2015). The Health Belief Model as an explanatory framework in communication research: Exploring parallel, serial, and moderated mediation. *Health Communication*, 30(6), 566–576. <https://doi.org/10.1080/10410236.2013.873363>
24. King, D., Kamble S., DeLongis, A., Sandman, P., Lanard, J., Silva J., et al. (2016). Coping with influenza A/H1N1 in India: Empathy is associated with increased vaccination and health precautions. *Emergency Medicine Australasia*, EMA 26, 31–37. <https://doi.org/10.1080/14635240.2016.1174950>
25. Kirb, J. (2016). Compassion interventions: The programmes, the evidence, and implications for research and practice. *Psychology and Psychotherapy: Theory, Research and Practice*, 90(3), 1-24. <https://doi.org/10.1111/papt.12104>
26. Kowalski, J., Marchlewska, M., Molenda, Z., Gorska, P., & Gawęda, Ł. (2020). Adherence to safety and self-isolation guidelines, conspiracy, and paranoia-like beliefs during COVID-19 pandemic in Poland: Associations and moderators. *Psychiatry Research*, 294, 113540. <https://doi.org/10.1016/j.psychres.2020.113540>
27. Lobato, E., Mendoza, J., Sims, V., & Chin, M. (2014). Examining the relationship between conspiracy theories, paranormal beliefs, and pseudoscience acceptance among a university population. *Applied Cognitive Psychology*, 28, 617–625. <https://doi.org/10.1002/acp.3042>
28. Lazarus, R. (1999). *Stress and emotion: A new synthesis*. New York, NY: Springer.
29. Lazarus, R., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.
30. Lee-Baggley, D., DeLongis, A., Greenglass, P., & Voorhoeve, E. (2004). Coping with the threat of Severe Acute Respiratory Syndrome: Role of threat appraisals and coping responses in health behaviors. *Asian Journal of Social Psychology*, 7(1), 9 - 23. <https://doi.org/10.1111/j.1467-839X.2004.00131.x>
31. Marinthe, G., Brown, G., Delouvee, S., & Jolley, D. (2020). Looking out for myself: Exploring the relationship between conspiracy mentality, perceived personal risk, and COVID-19 prevention measures. *British Journal of Health Psychology*, 25(4), 957–980. <https://doi.org/10.31234/osf.io/cm9st>

32. Massad, I., Al-Taher, R., Massad, F., Al-Sabbagh, M., Haddad, M., & Abufaraj, M. (2020). The impact of the COVID-19 pandemic on mental health: Early quarantine-related anxiety and its correlates among Jordanians. *Eastern Mediterranean Health Journal (EMHJ)*, 26 (10), 1165-1172. <https://doi.org/10.26719/emhj.20.115>
33. Mellstrom, U. (2020). COVID-19, masculinity, and risk/at risk. *Norma*, 15(2), 94–96. <https://doi.org/10.1080/18902138.2020.1762307>
34. Menzies, R., & Menzies, R. (2020). Death anxiety in the time of COVID-19: theoretical explanations and clinical implications. *Cognitive Behavior Therapist*, 13, e19. <https://doi.org/10.1017/S1754470X20000215>
35. Mohammadpour, M., Ghorbani, V., Khoramnia, S., Ahmadi, S. M., Ghvami, M., & Maleki, M. (2020). Anxiety, self-Compassion, gender differences and COVID-19: Predicting self-care behaviors and fear of COVID-19 based on anxiety and self-compassion with an emphasis on gender differences. *Iranian Journal of Psychiatry*, 15(3), 213–219. <https://doi.org/10.18502/ijps.v15i3.3813>
36. O'Brien, T., & DeLongis, A. (1996). The interactional context of problem-, emotion- and relationship-focused coping: The role of the big five personality factors. *Journal of Personality*, 64(4), 775–813. <https://doi.org/10.1111/j.1467-6494.1996.tb00944.x>
37. O'Brien T., & DeLongis, A. (1997). Coping with chronic stress. In B. Gottlieb B.H. (Ed.) *Coping with chronic stress*. The Springer Series on Stress and Coping. Springer. https://doi.org/10.1007/978-1-4757-9862-3_6
38. Piliavin, J. (2009). Altruism and helping: The evolution of a field: The 2008 Cooley-Mead Presentation. *Social Psychology Quarterly*, 72(3), 209-225. <https://doi.org/10.1177/019027250907200305>
39. Puterman, E., DeLongis, A., Lee-Baggley, D., & Greenglass, E. (2009). Coping and health behaviors in times of global health crises: Lessons from SARS and West Nile. *Global Public Health: An International Journal for Research, Policy and Practice*, 4(1), 69-81. <https://doi.org/10.1080/17441690802063304>
40. Rosenstock, I. (1974). Historical origins of the health belief model. *Health Education. Monographs*, 2, 328–335. <https://doi.org/10.1177/109019817400200403>
41. Rosenstock, I., Strecher, V., & Becker, J. (1988). Social learning theory and the health belief model. *Health Education Quarterly*, 15, 175–183. <https://doi.org/10.1177/109019818801500203>
42. Sallam, M., Dababseh, D., Yaseen, A., Al-Haidar, A., Ababneh, N., Bakri, F., & Mahafzah, A. (2020). Conspiracy beliefs are associated with lower knowledge and higher anxiety levels regarding COVID-19 among students at the University of Jordan. *International Journal of Environmental Research and Public Health*, 17(14), 4915. <https://doi.org/10.3390/ijerph17144915>
43. Srol, J, Ballova Mikuskova, E, & Cavojoval, V. (2021). When we are worried, what are we thinking? Anxiety, lack of control, and conspiracy beliefs amidst the COVID-19 pandemic. *Applied Cognitive Psychology*, 35, 720-729. <https://doi.org/10.1002/acp.3798>
44. Swami, V., Voracek, M., Stieger, S., Tran, U., & Furnham, A. (2014). Analytic thinking reduces belief in conspiracy theories. *Cognition*, 133, 572–585. <https://doi.org/10.1016/j.cognition.2014.08.006>
45. Swami, V., Weis, L., Lay, A., Barron, D., & Furnham, A. (2016). Associations between belief in conspiracy theories and the maladaptive personality traits of the personality inventory for DSM-5. *Psychiatry Research*, 236, 86-90. <http://dx.doi.org/10.1016/j.psychres.2015.12.027i>
46. Theodoropoulou, I., & Ahmed, I. (2018). Ethnographing gender roles and power in intercultural communication in Qatar. *Journal of Arabian Studies*, 8(1), 141-160. <http://dx.doi.org/10.1080/21534764.2018.1533697>
47. Temsah, M., Al-Sohime, F., Alamro, N., Al-Eyadhy, A., Al-Hasan, K., Jamal, A., Al-Maglouth, I., Aljamaan, F., Al Amri, M., Barry, M., Al-Subaie, S., & Somily, A. (2020). The psychological impact of COVID-19 pandemic on health care workers in a MERS-CoV endemic country. *Journal of Infection and Public Health*, 13(6), 877–882. <https://doi.org/10.1016/j.jiph.2020.05.021>
48. United Nations (UN). (2020). UN warns of a global mental health crisis due to COVID-19 pandemic. *World Economic Forum*. <https://www.weforum.org/agenda/2020/05/united-nations-global-mental-health-crisis-covid19-pandemic>
49. Wenham, C., Smith, J., Morgan, R., & Gender and COVID-19 Working Group (2020). COVID-19: The gendered impacts of the outbreak. *Lancet (London, England)*, 395(10227), 846–848. [https://doi.org/10.1016/S0140-6736\(20\)30526-2](https://doi.org/10.1016/S0140-6736(20)30526-2)
50. World Health Organization (WHO) (2020a). Director-General’s opening remarks at the media briefing on COVID-19 - 11 March 2020 [WWW Document]. URL <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-themedia-briefing-on-covid-19---11-march-2020> (accessed 4.7.2020).

does pandemic anxiety have effects on emotionality, government actions, and interpretation of the pandemic?

51. World Health Organization (WHO) (2020b). COVID-19 Coronavirus pandemic. World meter last updated: August 09, 2020, 20:54 GM. accessed August 2020 [https://www.worldometers.info/coronavirus/August 9](https://www.worldometers.info/coronavirus/August%2009)
52. Zettler, I., Thielmann, I., Hilbig, B. E., & Moshagen, M. (2020). The nomological net of the HEXACO model of personality: A large-scale meta-analytic investigation. *Perspectives on Psychological Science*, 15(3), 723–760. <https://doi.org/10.1177/1745691619895036>
53. Zhong, B.-L., Luo, W., Li, H.-M., Zhang, Q.-Q., Liu, X.-G., Li, W.-T., et al. (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *International Journal of Biological Sciences*, 16, 1745–1752. <https://doi.org/10.7150/ijbs.45221>