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The Role of Demographic Characteristics and Personality Traits in COVID-19-Related Anxiety and Preventive Behaviors

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Abstract

Introduction: This study aimed to evaluate the role of demographic characteristics and personality traits in ascertaining the severity of COVID-19 induced anxiety and the effectiveness of preventive behaviors among university students in Iran.

Materials and Methods: This descriptive-correlational study included a sample of 203 students (47 males and 156 females) enrolled in universities located in Mashhad (Iran) in 2021. Data collection was conducted using standardized questionnaires such as COVID-19anxiety questionnaire, Big Five personality traits, Preventive behaviors, and demographic characteristics through online platforms via social media to comply with health protocols. Data analysis was performed using SPSS version 26. Descriptive statistics, independent t-tests, Pearson correlation coefficients, and stepwise regression analyses were conducted to analyze the data.

Results: The findings from the regression analysis indicated that the personality traits of agreeableness and conscientiousness significantly elucidated the variability in COVID-19 anxiety. Specifically, agreeableness emerged as a significant predictor of preventive behaviors. Furthermore, this study revealed that male students exhibited higher anxiety levels than their female counterparts, while females demonstrated a greater engagement in preventive behaviors. Moreover, the consumption of substances and alcohol was associated with heightened anxiety and diminished preventive behaviors.

Conclusion: The results underscore the necessity of considering both demographic characteristics and personality traits when designing interventions that aim at mitigating health crises. Notably, the traits of agreeableness and conscientiousness may help reduce anxiety and promote preventive behaviors within such contexts.

Keywords: COVID-19 anxiety, Preventive behaviors, Personality traits, Demographic factors, University students

1. Introduction

The COVID-19 pandemic, recognized as an unprecedented global crisis, has significantly affected the mental well-being of individuals worldwide. The anxiety associated with this crisis represents a natural response to the unknown threats introduced by the pandemic and has substantially altered health behaviors and self-care practices. The nature and severity of this anxiety are frequently shaped by an array of demographic characteristics and personality traits [1-6].

Prior studies have indicated that demographic characteristics such as age, gender, marital status [7-11] , alcohol and substance consumption [12] , and education level [13, 14] exert considerable influence on COVID-19-related anxiety and preventive behaviors. For example, older adults, who are at an increased risk of contracting the virus, generally experience heightened anxiety and are more inclined to engage in preventive behaviors [7]. Women, owing to their higher awareness of health-related issues, are inclined to experience greater anxiety and demonstrate increased attentiveness to preventive behaviors [15]. In contrast, individuals possessing higher educational qualifications generally report lower levels of anxiety and display more preventive behaviors, likely due to enhanced access to reliable information and a more comprehensive understanding of associated risks [13].

In addition, studies have indicated the Big Five personality traits that affect both anxiety and preventive behaviors in different ways. Specifically, neuroticism is correlated with increased anxiety [16], whereas traits such as extraversion, agreeableness, and conscientiousness are associated with reduced anxiety levels and improved preventive behaviors, largely as a result of enhanced social support, empathy, and sense of responsibility [17-20].

This research holds significant importance for several reasons. First, anxiety related to COVID-19 can undermine adherence to preventive behaviors, potentially contributing to the further spread of the virus and placing additional burdens on healthcare systems [21]. Second, identifying the demographic characteristics and personality traits that influence COVID-19-related anxiety can facilitate the development of targeted intervention strategies aimed at reducing anxiety and enhancing self-care practices.

Cultural and societal differences can influence the relationship between personality traits, COVID-19-related anxiety, and engagement in preventive behaviors. A considerable body of research on COVID-19 anxiety and personality traits has primarily focused on Western populations, limiting the generalizability of findings to other cultural contexts such as Iran, due to variations in cultural norms and social structures. For instance, family roles, social networks, and cultural beliefs about managing anxiety and preventive measures may differ significantly within Iranian society compared to other cultures [22]. Moreover, since individual responses to anxiety and health behaviors are deeply influenced by cultural values and norms, this study aims to examine these dynamics within the Iranian cultural context—an area that remains relatively unexplored in current literature. By focusing on Iran's unique cultural framework, this research intends to offer evocative insights that can inform the effective management of psychological distress and the development of culturally appropriate mental health interventions.

2. Materials and Methods

Study Design and Sampling

This descriptive-analytical study utilized a cross-sectional framework conducted in Iran between April and July 2021. The target population included university students residing in Mashhad, a major city in Iran. The sample size was calculated using Green's [23] formula for regression analysis, defined as N = 8m + 50, where *m* represents the number of predictor variables. Considering 10 predictors—comprising five demographic variables (age, gender, marital status, educational level, and history of substance or alcohol use) and five personality traits—the minimum sample size was 130 participants. To address potential attrition and enhance the resilience of the results, the final sample size was increased to 203 participants

Data Collection

Participants were recruited through convenience sampling on popular Iranian social media platforms, including Instagram, Telegram, and WhatsApp. To enhance sample representativeness, recruitment messages were disseminated across diverse university-related groups (e.g., student councils, faculty-specific channels) and various districts within Mashhad, ensuring a balanced distribution across age, gender, and geographic location.

Inclusion Criteria

• Age 18 or older

• Resident of Iran

• Ability to read and understand Persian

• Active use of social media platforms, defined as using any social media site (e.g., Instagram, Telegram, WhatsApp) at least once a week during the data collection period. This was confirmed via a preliminary screening question: "How often do you use social media in a typical week?"

Exclusion Criteria

• Individuals with self-reported diagnosed psychiatric disorders (to avoid confounding variables)

• Participants who did not complete the entire survey

• Those reporting social media use less than once per week

Research Instruments

NEO Five-Factor Inventory (NEO-FFI): The NEO-FFI is a 60-item tool designed to assess five key personality traits including neuroticism, extraversion, agreeableness, openness to experience, and conscientiousness. Costa and McCrae [24] calculated the reliability coefficients for each trait, reporting neuroticism as 0.77, extraversion as 0.73, agreeableness as 0.81, openness to experience as 0.86, and conscientiousness as 0.86. Additionally, Rosenchessley et al. [25] validated the tool's validity and reliability via the use of exploratory and confirmatory factor analysis, demonstratingsatisfactory psychometric properties.

Preventive Behavior Questionnaire:

Taghir et al. [26] developed this questionnaire to assess COVID-19 preventive behaviors. This tool consists of 9 items that assess behaviors including reduced utilization of public spaces, compliance with preventive protocols when coughing, appropriate hand washing and surface decontamination, as well as discussion regarding preventive behaviors. Responses are evaluated on a binary Yes/No scale, attributing one point for a suitable preventive behavior and zero points for absence of such behavior. Total scores may vary between 0 and 9, with a score of 75% or above indicating high performance and scores below 75% indicating low performance. In a study conducted by Taghir et al. [26], the questionnaire exhibited satisfactory reliability, evidenced by a Cronbach's alpha of 0.81. In the current study, the calculated Cronbach's alpha was determined to be 0.82.

COVID-19 Anxiety Scale (CDAS): This instrument was developed by Alipour et al.[27]. This tool consists of 18 items scored on a four-point Likert scale (0 = never, 3 = always), with total scores that range from 0 to 54. Higher scores signify greater levels of COVID-19-related anxiety. A score ranging from 0 to 16 indicates mild or no anxiety; scores from 17 to 29 reflect moderate anxiety, while scores between 30 and 54 signify severe anxiety. The construct validity of the scale has been confirmed through factor analysis, and its reliability (which was estimated via Cronbach's alpha) was reported as 0.91. In this study, Cronbach's alpha for the CDAS was calculated at 0.92.

Demographic Information Questionnaire: This questionnaire was developed by our researchers and it consists of five Yes/No questions aimed at evaluating the demographic characteristics of the participants, such as age, gender, marital status, educational level, and history of alcohol or substance use.

Data analysis

Descriptive statistics such as frequencies, means, and standard deviations were calculated for the study variables. Inferential statistics consisted of Student's t-test, Pearson correlation, and stepwise regression analysis, all of which were utilized to assess relationships between this study's variables. All data were analyzed via the SPSS **version**26.

3. Results

Table 1 provides a comparative analysis of anxiety levels and preventive behaviors across different demographic groups. The data highlights variations based on age, gender, educational background, and substance or alcohol use history, indicating where statistically significant differences were observed.

Table 1. Demographic characteristics of the participants and their associations with COVID-19 anxiety and preventive behaviors.

Variable	Category	Frequency	Preventive self-care (Mean ± SD)	p-value	COVID-19 anxiety (mean ± SD)	P-value
Age	< 30 years	109	6.84± (2.40)	0.10	17.30±(10.45)	0.46
	> 30 years	92	7.38±(2.22)		16.22±(10.22)	
Gender	Female	156	7.29± (2.26)	0.02	15.82± (10.28)	0.01
	Male	47	6.42±(2.43)		20.08±(9.70)	
Marital status	Single	85	7.23± (2.28)	0.46	16.47± (11.13)	0.70
	Married	118	7±(2.36)		17.06±(9.67)	
Educational level	Associate/bachelor	117	7.01 (2.31)	0.58	15.64± (10.44)	0.06
	Master/doctorate	86	7.19 (2.34)		18.40± (9.90)	
Substance/alcohol use	No	190	7.20(2.29)	0.01	1 6.22± (10.29)	0.000
	Yes	13	5.53 (2.29)		25..38± (5.20so)	

Table 1 showcases the findings which indicate that individuals under the age of 30 exhibit elevated mean anxiety levels (17.30±(10.45) in comparison to those aged 30 and older 16.22±(10.22), although this difference lacks statistical significance (p=0. 46). The data indicates that males have significantly higher levels of anxiety than females (p=0.02). Moreover, men displayed significantly lower preventive behaviors than their female counterparts (p=0.01). Greater educational qualifications were associated with lower anxiety levels; however, this relationship was not statistically significant (p = 0.06). In addition, individuals with a history of substance or alcohol use reported significantly lower levels of preventive behaviors coupled with higher anxiety levels (p<0.001). In the case of marital status, no statistically significant difference was observed among the groups.

Table 2. Means, standard deviations, and Pearson correlations between personality traits, COVID-19 anxiety, and preventive behaviors

Variables	Mean± SD	COVID-19 anxiety	preventive behaviors	Neuroticism	Extraversion	Openness to experience	Agreeableness	Conscientiousness
COVID-19 anxiety	16.81±10.28	1						
preventive behaviors	7.09±2.32	-0.14*	1					
Neuroticism	21.39±7.10	0.44**	-0.11	1				
Extraversion	27.44±6.93	-0.34**	0.07	-0.55**	1			
Openness to experience	27.07±5.25	-0.32**	0.050	-0.30**	0.33**	1		
Agreeableness	29.60±7.91	-0.60**	0.22**	-0.53**	0.49**	0.33**	1	
Conscientiousness	31.14±9.18	-0.59**	0.19**	-0.58**	0.58**	0.35**	0.66**	1

** p<0.05, * p<0.01

Table 2 demonstrates a detailed account of the mean COVID-19 anxiety score within the samples recorded at 16.81 with a standard deviation of 10.28. A significant positive relationship was identified between COVID-19 anxiety and neuroticism ($r = 0.44$, $p < 0.01$), indicating that higher levels of neuroticism are correlated with increased anxiety related to the COVID-19 pandemic. On the other hand, there were significant negative relationships between COVID-19 anxiety and extraversion ($r = -0.34$, $p < 0.01$), openness to experience ($r = -0.32$, $p < 0.01$), agreeableness ($r = -0.60$, $p < 0.01$), and conscientiousness ($r = -0.59$, $p < 0.01$). These results imply that individuals who have higher levels of these personality traits are less susceptible to COVID-19-related anxiety.

The mean and standard deviation of preventive behaviors were 7.09 and 2.32, respectively. There was a significant and positive relationship between preventive behaviors and both agreeableness ($r = 0.22$, $p < 0.01$) and conscientiousness ($r = 0.19$, $p < 0.01$). These findings indicate that individuals exhibiting higher levels of these personality traits are more inclined to engage in preventive behaviors. Additionally, a significant and negative relationship was observed between preventive behaviors and COVID-19 anxiety ($r = -0.14$, $p < 0.05$), meaning that higher levels of anxiety lead to reduced likelihood of engaging in preventive behaviors.

In order to thoroughly examine the impact of demographic characteristics and personality traits on COVID-19 anxiety and preventive behaviors, stepwise multiple regression analysis was used. The results (detailed in Tables 3 and 4) provide a comprehensive assessment of the relative contributions of these variables, thereby providing substantial insights into the psychological and behavioral responses to the COVID-19 pandemic within the studied population. These results highlight the intricate interplay among said personality traits.

Table 3. Prediction of COVID-19 anxiety based on demographic characteristics and personality Traits

Model	Variable(s) entered	B	SE	Beta	T	P	R 2	F	P
Step1	Agreeableness	-0.78	0.07	-0.60	-10.70	0.000	0.36	114.48	0.000
Step2	Agreeableness	-0.48	0.09	-0.37	-5.18	0.000	0.43	75.58	0.000
	Conscientiousness	-0.39	0.08	-0.35	-4.86	0.000			

Table 3 showcases the stepwise regression analysis aimed at predicting COVID-19 anxiety through demographic characteristics and personality traits. In the first step, agreeableness, with a standardized beta coefficient of ($B = -0.35$, $p < 0.001$), is identified as a primary significant predictor of reduced COVID-19 anxiety. The model's R^2 value of 0.36 indicates that 36% of the variance in COVID-19 anxiety is attributable solely to agreeableness, thereby emphasizing its critical role in alleviating pandemic-related anxiety.

In the next step, the inclusion of conscientiousness in the model increases the R^2 value to 0.43, indicating a 7% improvement in the explained variance of COVID-19 anxiety. The beta coefficients for agreeableness and conscientiousness -0.37 ($p < 0.001$) and -0.35 ($p < 0.001$), respectively, both of which exhibit statistical significance. These results demonstrate that the reduction of COVID-19 anxiety is significantly affected by both agreeableness and conscientiousness. The addition of conscientiousness inthe initial model enhances its explanatory power, meaning that it also

accounts for a greater portion of the variance in COVID-19 anxiety.

Table 4. Stepwise regression analysis of personality traits predicting preventive preventive behaviors

Variable(s) entered	B	SE	Beta	T	P	R 2	F	P
Agreeableness	0.06	0.02	0.22	3.21	0.002	0.05	10.34	0.002

Table 4 demonstrates the results of a stepwise regression analysis assessing the prediction of preventive behaviors based on demographic characteristics and personality traits. The analysis reveals a significant relationship between agreeableness and preventive behaviors ($p = 0.002$). The standardized beta coefficient ($\beta = 0.22$) indicates that each standard deviation increase in agreeableness corresponds to a 0.22 standard deviation increase in preventive behaviors. The unstandardized beta coefficient ($B = 0.06$) suggests that for each one-unit increase in agreeableness, preventive behaviors increase by 0.06 units. The R^2 value of 0.05 establishes that agreeableness accounts for 5% of the variance in preventive behaviors. Regardless of the relatively modest proportion of explained variance, the statistical significance of the regression model ($F = 10.34$, $p = 0.002$) accentuates that agreeableness serves as a meaningful predictor of preventive behaviors, thereby underscoring its significant role in explaining variations in preventive behaviors.

4. Discussion

The present study examined the impact of demographic characteristics and personality traits on COVID-19-related anxiety and preventive behaviors among Iranian university students. Moreover, the findings highlight the significant role that these factors play in influencing both anxiety levels and preventive behaviors.

It should be pointed out that male participants reported higher levels of COVID-19 anxiety compared to female participants. This finding is contrast with the results of Fernández-de-Las-Peñas et al.'s study [15], which mostly identified increased anxiety levels among females. One possible explanation for this discrepancy lies in cultural expectations within the Iranian context, the necessity of men working outside of their homes, and their heightened vulnerability to the virus compared to women. Additionally, socioeconomic stressors like job insecurity may have disproportionately affected men during the pandemic, enhancing their psychological vulnerability. Furthermore, methodological differences—including sampling strategies, measurement tools, and population characteristics—may also account for these inconsistent findings. To enhance a more precise understanding of these gender-based differences in anxiety, future research should examine the role of cultural, occupational, and methodological factors in greater detail With regard to the preventive behaviors, it was observed that female individuals are more likely to engage in protective behaviors against COVID-19 than their male counterparts; this finding was consistent with the results of Saadat et al. [3] and Fernández-de-Las-Peñas et al.'s studies [15]. This gender-related disparity may stem from the heightened emphasis women typically place on personal hygiene and their protective role within familial structures, particularly in Iranian culture, where familial support systems frequently incentivize preventive health practices among individuals, regardless of their marital status.

In contrast to initial expectations, age and marital status did not demonstrate a significant impact on either anxiety or preventive behaviors. This finding differs from the results of Murayama et al. [9] and Tan et al.'s studies [8], which identified these variables as potential determinants of preventive behaviors. The absence of a significant effect might be due to other unobserved contextual variables. For instance, it is possible that in the Iranian context, extended family support is culturally emphasized for both single and married individuals, presumably minimizing behavioral differences. However, this interpretation should be considered with caution, as no direct measures of family support were included in the present study. Further research is required to validate this hypothesis. Furthermore, substance and alcohol use were

associated with higher anxiety and lower preventive behaviors, which aligns with the findings reported by Rot et al. (12). The use of substances may increase risky behaviors and impair attention to personal hygiene, thereby intensifying anxiety and diminishing preventive behaviors. These findings underscore the necessity for targeted mental health interventions and preventive strategies for individuals exhibiting a history of substance use.

Unexpectedly, higher levels of educational attainment were linked to increased anxiety, which stands in contrast to the findings of Joannès et al.'s study [13]. One plausible explanation for this result is that individuals with higher education may possess greater access to scientific information, a more nuanced understanding of the pandemic's potential repercussions, and increased social and professional obligations, all of which could contribute to increased anxiety levels. It is recommended that future studies be conducted to further examine and explore the relationship between educational attainment and anxiety during health crises.

In addition, increased levels of anxiety were found to be associated with a reduction in preventive behaviors, which is in line with the results of Boden et al.'s study [21]. This reduction may stem from decreased motivation, psychological fatigue, and ongoing worry, all of which can hinder individuals' ability to comply with recommended health behaviors. Particularly, severe anxiety may result in paying less attention to protective measures such as frequent hand washing and the use of masks, as individuals may become engrossed in excessive concerns regarding future uncertainties or potential consequences of contracting the virus.

Personality traits are also significant predictors of both anxiety and preventive behaviors. A positive relationship was found between neuroticism and COVID-19anxieties, suggesting that individuals with elevated neuroticism experience increased anxiety levels. This result is consistent with Kroencke et al.'s study [16], who reported that individuals who have high levels of neuroticism are more susceptible to negative emotional responses and are especially vulnerable to anxiety in high-stress scenarios such as the COVID-19 pandemic.

Conversely, the traits of agreeableness, conscientiousness, extraversion, and openness to experience had a negative relationship with anxiety. Higher levels of agreeableness (signified by cooperative and empathetic tendencies), and conscientiousness (defined by a sense of responsibility and diligence) have been shown to decrease anxiety. These results align with the studies conducted by Bogg & Milad [17] and Patitsa et al. [18].

Regression analyses further demonstrated that agreeableness and conscientiousness serve as significant predictors of COVID-19 anxiety, while agreeableness was shown to be predictor of preventive behaviors. These findings are consistent with the results of Bogg & Milad [17] and Patitsa et al.'s studies [18], who demonstrated that agreeable individuals are more prone to participate inpreventive behaviors as a result of their heightened empathy and cooperative nature. Similarly, individuals with high levels of conscientiousness (who are recognized for their diligence and sense of responsibility)are more inclined to adhere to preventive health measures with greater rigor [18].

5. Conclusion

In summary, this study implies that personality traits play a more pronounced role than demographic characteristics in predicting both preventive behaviors and COVID-19 anxiety. Among the limitations of this study was its dependence on convenience sampling and online data collection methods, which hindered the generalizability of the findings. Future studies should examine mediating variables, such as health literacy and social support, to offer a more holistic understanding of the influence of personality traits on health behaviors and anxiety during pandemics. Finally, this study's findings could guide the formulation of effective intervention and treatment programs aimed at enhancing preventive behaviors and reducing anxiety during public health crises, such as the COVID-19 pandemic.

Ethical Considerations

Compliance with ethical guidelines

This study received ethical approval from the Ethics Committee of - Islamic Azad University of Medical Sciences, Tehran (Approval ID: IR.IAU.SRB.REC.1400.132).

All participants were guaranteed anonymity (instructed not to disclose their names) and provided informed consent electronically. They were informed of their right to withdraw at any time without consequences, and all responses were collected confidentially for subsequent statistical analysis.

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Author's contributions

All authors equally contributed to the conceptualization, literature review, drafting, and revision of this article. They assume complete accountability for the precision of the content presented in this paper.

Conflict of interest

The authorsaffirm that there are no conflicts of interest pertaining to the publication of this study.

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