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Mediating Role of Health Anxiety in the Relationship between Feelings of Loneliness and Personality Traits among Nurses

Mersad Choubtashani[1], Bi Bi Nasira Nabawi[1*], Zeinab Maleki[1], Somaye Keshavarz[2]

1. Department of Psychology, Imam Khomeini International University of Psychology, Qazvin, Iran
2. Assistant Professor, Department of Psychology, Faculty of Social Sciences, Imam Khomeini International University, Qazvin, Iran

Corresponding author: Nasira Nabawi, Department of Psychology, Imam Khomeini International University of Psychology, Qazvin, Iran. Email: nasira.nabawi800@gmail.com

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Abstract

Background: Health anxiety has been correlated with life satisfaction, personality, and alexithymia in junior college nursing students.

Objectives: The present study sought to provide a model of the relationship between feelings of loneliness and personality traits with the mediating role of health anxiety among nurses.

Methods: According to the data collection method, this research was part of a descriptive-correlational study performed using path analysis. The statistical population included all nurses at Ibn Sina, Omid, and Erfan hospitals in Tehran in 2022. A total of 300 nurses were selected via the convenience sampling method and completed the Loneliness Scale, The Five-Factor Personality Inventory, and Short Health Anxiety Inventory. Data analysis was performed using SPSS software and Smart PLS3.

Results: The results demonstrated that extroversion, agreeableness, and conscientiousness had a direct impact on health anxiety and loneliness ($P<0.05$). The mediating role of health anxiety was confirmed in the link between extroversion and loneliness, as well as between agreeableness and loneliness ($P<0.05$). Nonetheless, the indirect effect of conscientiousness on loneliness through health anxiety was found to be non-significant ($P<0.05$). Overall, the model showed a good fit, indicating that personality traits and health anxiety play a significant role in determining nurses' feelings of loneliness ($P<0.05$).

Conclusion: A thorough understanding of health-related aspects of nurses can assist mental health researchers and managers in developing and implementing precise and efficient psychosocial interventions.

Keywords: Health anxiety, Loneliness, Nurses, Personality traits

1. Background

As indispensable healthcare team members, nurses have a critical role in society. Therefore, prioritizing the well-being of these professionals is essential for the overall health of the community (1). Given that individuals in this profession maintain close interactions with patients and deal with challenging medical conditions, they are in constant exposure to high levels of psychological stress (2). The feeling of loneliness is a critical psychological issue that has garnered attention in the realm of interpersonal relationships in recent decades (3). It signifies individuals' recognition of their deficiencies and insufficiencies within social connections, resulting in loneliness, emptiness, apprehension, and anxiety (4). Loneliness emerges as a response to the absence of fulfilling and positive

relationships, with Sullivan (1953) identifying it as lacking the fundamental human necessity for intimacy (5), thereby characterizing it as a sense of deprivation from social bonds (6). A wide array of factors and attributes are linked to the experience of loneliness, with five personality traits playing a key role in this phenomenon (7).

The five-factor personality theory proposed by Costa and McCrae (1987) highlights extroversion, openness, conscientiousness, and agreeableness as prominent components (8). The related studies have established a substantial association between personality traits and feelings of loneliness, with appropriate features, such as neuroticism and extraversion, playing significant roles in predicting loneliness across different cultural contexts (9). It has been evidenced that personality traits are closely correlated with perceived stress and loneliness, particularly amid challenging circumstances, such as global pandemics (10). Neuroticism has been identified as a predisposing factor for anxiety and loneliness, indicating its role as a vulnerability factor in such situations (11). Research conducted by Chen et al. (2021) explored the relationship between personality traits and loneliness in boxers, revealing that such traits as conscientiousness, extroversion (12), and agreeableness were inversely associated with loneliness, while neuroticism displayed a positive correlation with feelings of loneliness (13).

It is worth noting that the correlation between personality traits and feelings of loneliness is complex, as various factors can affect each of these variables and their relationship (14). For instance, health anxiety may play a role in shaping this connection indirectly. Excessive concerns, constant thoughts about sickness, avoidance of actions, and seeking reassurance are identified as health anxiety disorders (15). The prevalence of health anxiety disorders is estimated to be clinically significant, affecting around 13% of the adult population (16) (Scarella, Boland, & Barskay, 2019). The prevalence rate of this disorder was reported as 6.6% in a study conducted in Iran (17). Research has pointed to a connection between personality traits and health behaviors. For instance, individuals with a neurotic personality trait tend to experience higher levels of stress and health anxiety (18).

According to studies by Metz et al. (19) and Starcevic et al. (20), neuroticism and extroversion are linked to depression and health anxiety, with extroversion having a negative correlation with the former and a positive correlation with the latter. These personality traits are also considered predictors of depression and anxiety, and there is a potential risk of developing diseases associated with feelings of loneliness (19,20). In separate studies by Choi et al. (21), Costantini et al. (22), Keykha and Nastiezaie (4), and Deguma et al. (2022), it was found that disease anxiety is connected to negative emotions, such as fear, worry, despair, and loneliness (23). In addition, Durmuş and Öztürk (2022) explored the impact of the COVID-19 pandemic on the emotional well-being of older adults in Turkey, revealing that the elderly with lower anxiety levels regarding disease contraction experienced lower levels of despair and loneliness, while their spiritual well-being remained at an average level (24).

2. Objectives

According to previous studies, the five personality factors may have a direct correlation with feelings of loneliness and health anxiety, or they may have an indirect connection with loneliness caused by health anxiety. Past research in the country has looked into the association between personality traits and anxiety or loneliness separately. Nevertheless, no research has specifically examined how personality traits,

loneliness, and health anxiety are interrelated in nurses. In light of the aforementioned issues, the present study aimed to create a model that links loneliness, personality traits, and health with a focus on nurses. The researchers' aims are illustrated in Figure 1.

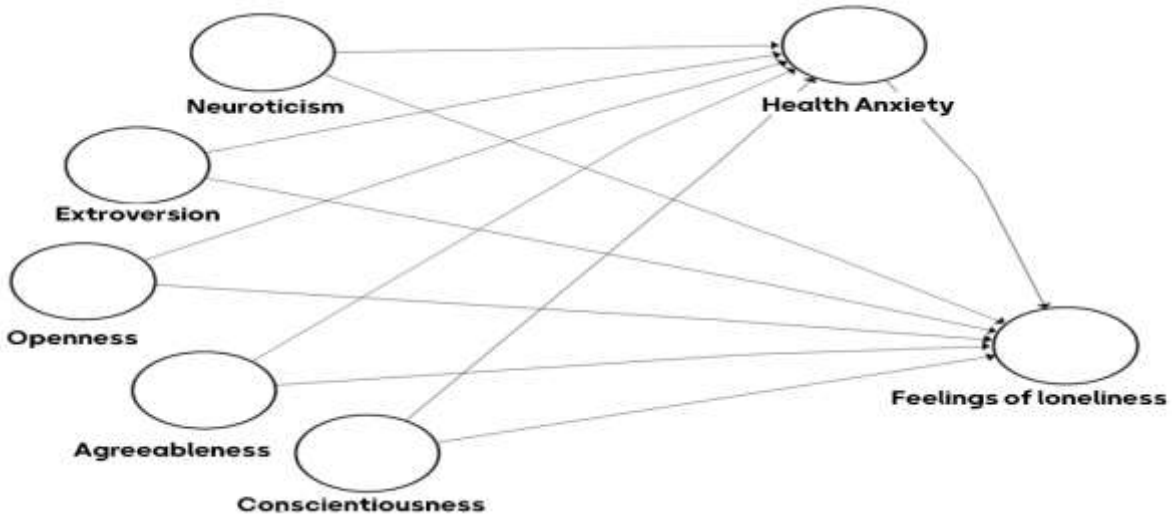

Figure 1. Conceptual model of the research

3. Methods

According to the method of data collection, the current research is part of a descriptive-correlational study that was performed using path analysis. The statistical population included all nurses in Ibn Sina Hospital in District 2 (235 nurses), Omid Hospital in District 5 (280 nurses), and Erfan Hospital in District 2 (320 nurses) from September to November 2022. Among this population, 300 cases were selected via convenience sampling. A total of 835 nurses were working in the three mentioned hospitals. The sample size supports Klein's recommendation that 2.5-5 people per topic is sufficient, although a minimum sample size of 200 subjects is acceptable (25). In this study, according to questionnaire items (20 items on feelings of loneliness, 60 items on five-factor personality traits, and 19 items on concerns about body image), a minimum of 247 nurses were required; however, 300 cases were selected taking into account the possibility of sample attrition. The distribution and collection of questionnaires lasted seven months (from early May to mid-December). To bias the surveys, it subjected 32 of the 268 surveys to statistical analysis. It should be noted that the questionnaire was submitted and received by the researcher, and all standards of research ethics, including confidentiality and incompleteness of the study, were considered. The inclusion criteria were the absence of any acute mental illnesses and being a nurse. On the other hand, the exclusion criteria entailed the inability to complete the questionnaire correctly, taking psychiatric medication, and reluctance to engage in the study. This study used statistical results at two levels: descriptive and inferential insights. At the descriptive level, demographics and key variables were described using frequencies and frequency percentages, means, and standard deviations. At the inference level, the validity and reliability of the questionnaires were checked by confirmatory factor analysis. The Pearson correlation test was employed to assess relationships between variables, and study

models were evaluated using the partial least squares (PLS) structural equation modeling technique. Data analysis was performed using SPSS software (version 27) and PLS3. The maximum alpha error value for hypothesis testing was assumed to be 0.05.

Research instruments

The University of California Los Angeles (UCLA) Loneliness Scale (ULS): this 20-item questionnaire was developed by Russell. (26) The descriptive phrases 1, 4, 5, 6, 9, 10, 15, 16, 19, and 20 are reversely scored. Each item is rated on a four-point scale, ranging from 1 (never), 2 (rarely), 3 (sometimes), and 4 (always). The ULS scale scores can be from 20 to 80. Higher scores mean feeling lonelier. Zarei et al. (27) reported the reliability of this scale based on Cronbach's alpha of 0.91. The validity of ULS was confirmed with a content validity index of 0.95 and a content validity ratio of 0.93. In the current research, the reliability of UCLA was 0.87 using CronbachCronbach'soefficient.

Five-Factor Personality Inventory (NEO-FFI): The NEO-FFI is a short form of the five five-factor personality scale developed by Costa and McCrae in 1983 (8). It consists of 60 items, which are rated on a five-point Likert scale, ranging from 1 "strongly" disagree" to 5 "strongly" agree." Items"1, 6, 11, 16, 21, 26, 31, 36, 41, 46, 51, and 56 are related to neuroticism. Extraversion items are 2, 7, 12, 17, 22, 27, 32, 37, 42, 47, 52, and 57. Openness items are 3, 8, 13, 23, 28, 33, 38, 43, 48, 53, and 58. The next trait included in this inventory is agreeableness which is manifested in items 4, 9, 14, 19, 24, 29, 34, 39, 44, 49, 54, and 59. The last classification of items (i.e., 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, and 60) is related to conscientiousness. Anisi et al. showed acceptable reliability of NEO-FFI among Iranians in their study (Cronbach's alpha=83) (28). Regarding the fact that the alpha for every trait was above 0.80, it can be concluded that all the five traits of the Persian NEO-FFI were internally consistent (r=0.73). The reliability of the NEO-FFI in the current study was acceptable (Cronbach's alpha=0.71).

Short Health Anxiety Inventory (SHAI): The health anxiety questionnaire was developed by Salkovskis et al. (2002) and consists of 18 self-report statements with four options for each statement (29). The questionnaire assesses the likelihood of getting a disease (n=14) and the negative outcomes of contracting a disease (n=4). Participants report on their health anxiety over the past six months. The questionnaire items address health-related worries, attention to physical changes or sensations, and the severe consequences of illness. Responses are scored on a four-point scale (from 0-3), with scores ranging from 0-54. Higher scores are indicative of higher levels of health anxiety. Various studies have found that this questionnaire has strong internal consistency, with internal consistency coefficients ranging from 0.71-0.95. In Iran, the reliability of the questionnaire was calculated to be 0.79 using Cronbach's alpha (30). In the present study, Cronbach's alpha for the health anxiety scale was determined to be 0.88.

4. Results

The research involved 148 (55.2%) females and 120 (44.8%) males. Regarding marital status, the majority of subjects (61.2%) were married. In terms of education, 179 (66.8%) participants held bachelor's degrees, 23 (8.6%) cases had diploma and post-diploma education, and 66 (24.6%) subjects had post-graduate and doctorate education. The mean age of respondents was 36.58±9.58 years, and their mean work experience was 13.64±8.81 years.

As illustrated in Table 1, conscientiousness

and neuroticism had the highest (46.64±6.53) and lowest (33.31±7.72) mean scores, respectively. Health anxiety had a total mean of 30.09±7.95, and loneliness had a mean of 36.79±10.68. The skewness and kurtosis values fell within the range of +2 to -2, suggesting that all variables exhibited a normal distribution or were close to a normal distribution.

The Pearson correlation test results (Table2) indicate that, except for openness to experience, all relationships between the variables in Table 2 were verified. The study revealed that loneliness was associated with neuroticism, extroversion, agreeableness, conscientiousness, and health anxiety (P>0.05). Moreover, neuroticism, extroversion, agreeableness, and conscientiousness were significantly correlated with the mediating variable of health anxiety.

Table 1. Description of the main variables and normality check with skewness and kurtosis indices

Variables	Mean ± SD	skewness	kurtosis
Neuroticism	33.31 ± 7.72	0.12	-0.61
Extroversion	38.40 ± 5.82	-0.07	-0.23
Openness	37.69 ± 4.62	0.02	-0.24
Agreeableness	41.67 ± 5.37	-0.08	0.01
Conscientiousness	46.64 ±6.53	-0.41	0.15
Health anxiety	30.09 ± 7.95	0.85	0.60
Feelings of loneliness	36.79 ±10.68	0.33	-0.67

Table 2. Correlation and discriminant validity matrix

Variables	VIF	Neuroticism	Extroversion	Openness	Agreeableness	Conscientiousness	Health Anxiety	loneliness
Neuroticism	2.09	0.64						
Extroversion	1.73	-0.61**	0.66					
Openness	1.02	-0.03	0.04	0.66				
Agreeableness	1.26	-0.38**	0.25**	0.03	0.65			
Conscientiousness	1.57	-0.51**	0.48**	-0.07	0.39*	0.59		
Health Anxiety	1.35	0.50**	-0.35**	-0.04	0.28**	-0.33**	0.65	
Feelings of loneliness		0.59**	-0.50**	0.03	-0.47**	-0.51**	0.42**	0.69

**P≤0.01 ; *P≤0.05

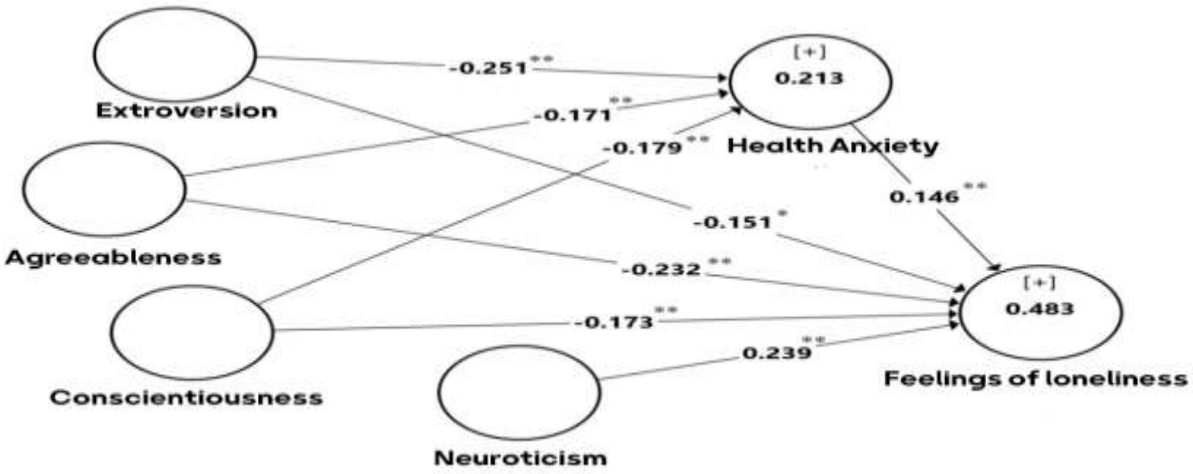

Figure 2. Experimental model in the case of standard path coefficients (and t-statistics)

Table 3. Results of direct and indirect effects

Effects		Standard coefficient	Standard error	t	p
Direct relationship	Extroversion -> health anxiety	-0.251	0.066	3.80	<0.001
	Agreeableness -> health anxiety	-0.171	0.057	2.99	0.003
	Conscientiousness -> health anxiety	-0.179	0.067	2.68	0.008
	Extroversion -> Feelings of loneliness	-0.151	0.060	2.51	0.013
	Agreeableness -> Feelings of loneliness	-0.232	0.057	4.07	<0.001
	Conscientiousness -> Feelings of loneliness	-0.173	0.056	3.09	0.002
	Neuroticism -> Feelings of loneliness	0.239	0.062	3.83	<0.001
	Health anxiety -> Feelings of loneliness	0.146	0.053	2.76	0.006
Indirect relationship	Extroversion -> health anxiety -> feeling lonely	-0.037	0.08	2.08	0.038
	Agreeableness -> health anxiety -> Feelings of loneliness	-0.025	0.013	1.97	0.049
	Conscientiousness -> health anxiety -> Feelings of loneliness	-0.026	0.015	1.72	0.086

Figure 2 represents the standard model, and based on the results of all relationships in the experimental model, it is statistically significant at the 95% confidence level (P<0.05). When comparing correlation coefficients, it was found that the most prominent relationships in the model are those between extroversion and health anxiety, with a coefficient of -0.251, and neuroticism and loneliness, with a coefficient of 0.239.

Examining the fit indices of the model demonstrated that the coefficient of determination for the dependent variable of loneliness was equal to 0.483; accordingly, the independent and mediating variables of the model could explain 48.3% or half of the variance of loneliness, illustrating the appropriate explanatory power of the model. The value of the Q2 index (CV-Redundancy) for feeling alone was 0.448, which was higher than the desired value of 0.35, and the Q2 index relatively confirmed the fit of the structural part. The normalized fit index was equal to 0.92, which was a suitable and acceptable value, indicating the fit of the model. The standardized root mean square residual had a relatively good value of 0.077. None of the fit indexes had a poor value, and all values were higher than average or desirable, based on which the fit model was relatively confirmed.

The findings from the direct effects analysis (Table 3) illustrated that extraversion, agreeableness, and conscientiousness had a direct impact on health anxiety and loneliness (P<0.05). In addition, neuroticism and health anxiety directly affect loneliness (P<0.05). Further analysis revealed that health anxiety acts as a mediator in the link between extraversion, agreeableness, and loneliness (P<0.05). Nonetheless, the indirect effect of conscientiousness on loneliness through health anxiety was not statistically significant (P<0.05).

5. Discussion

This study sought to explore the mediating role of health anxiety in the association between personality traits and feelings of loneliness among nurses. The findings revealed that health anxiety acts as a mediator between personality traits and nurses' feelings of loneliness. This outcome is in agreement with previous studies conducted by Direkvand-Moghadam et al. (11), Freilich et al. (9), and Itzick et al. (13), suggesting that personality traits can predict loneliness by affecting individuals' ability to form and maintain social relationships. Individuals who exhibit low levels of agreeableness, conscientiousness, or neuroticism may struggle to establish social connections, leading to increased loneliness (14). On the contrary, individuals with high

levels of agreeableness, characterized by optimism, altruism, and empathy, are more likely to engage in social interactions and experience lower levels of loneliness (12). Extroverts and those who are open to new experiences may also feel a sense of loneliness as they seek out new social relationships (13). Finally, individuals who possess a strong sense of internal responsibility and believe in their ability to control their lives tend to experience lower levels of loneliness compared to those who feel they have little control (31).

The findings in the other section demonstrated that health anxiety acts as a mediator between personality traits and feelings of loneliness. This conclusion aligns with the research findings reported by Metz et al. (19) and Kluwe-Schiavon et al. (32). It is also consistent with the results of the studies by Choi et al. (21), Costantini et al. (22), Keykha and Nastiezaie (4), and Deguma et al. (23), who indicated a relationship between health anxiety and loneliness.

As mentioned earlier, disease anxiety correlates positively with neuroticism and introversion personality traits and negatively with extroversion, openness to experience, responsibility, and conscientiousness. In explaining this data, it can be inferred that neuroticism denotes a lack of mental resilience, leading to difficulty in adapting behaviors that impact the external environment. According to Kluwe-Schiavon et al. (2022), most psychologists suggest that genetic predisposition is required for neuroticism to affect one's behaviors. Essentially, individuals with neurotic tendencies lack emotional stability due to genetic factors, making them more susceptible to anxiety and stress (32). Consequently, neuroticism represents a primary personality trait characterized by negative emotions, such as health-related anxiety, followed by fear, worry, despair, and loneliness. Deguma et al. (2022) revealed that individuals scoring low in agreeableness and conscientiousness exhibit emotional instability and are more prone to anxiety-related disorders and loneliness. Moreover, lack of responsibility and conscientiousness leads to disorganization, impulsive behavior, rationalization, reduced dependability, and shifting responsibility to others (23). Such individuals, lacking self-control and trust, tend to experience anxiety and struggle to express their emotions, especially in stressful situations, such as illness conditions, according to Starcevic and Janca (2022). In a similar vein, they noted that neurotic individuals are genetically predisposed to lower emotional stability, resulting in heightened anxiety and tension in response to disruptive environmental stimuli. The research findings confirm the notion that psychological factors do not solely cause mental health issues in a straightforward manner; rather, the interactive nature of variables should also be acknowledged (20). Understanding the components involved in the relationship between nurses' health can offer insight for researchers and mental health professionals in creating and implementing precise and impactful psychosocial interventions (22-24).

In terms of limitations, it should be acknowledged that this study was conducted on nurses in Tehran; therefore, great caution should be exercised when generalizing the results to all nurses. Future research should consider involving other professions and nurses from various cities to improve the diversity of the sample. Another drawback of the study is the sampling method used; therefore, it is suggested that random sampling be employed in future studies. Furthermore, a longitudinal research design would provide a more comprehensive understanding of the variables than the cross-sectional design used in this study.

6. Conclusion

The results of this study confirm the belief that psychological factors do not solely and

directly cause psychological injuries. As mentioned earlier in the explanation, it is essential to consider the interactive role of variables in this situation.

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Consent for publication: The Publisher must receive the signed Consent to Publish in order to obtain author permission to publish the Work.

Ethics approval and consent to participate: The Ethics Committee of Imam Khomeini International University approved the study (IR.IKhIU.REC.1401.055). The study was conducted in accordance with the principles of the Helsinki Declaration.

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