



# Association of Personality Traits with Treatment Adherence in Vitiligo

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## Abstract

**Background:** Vitiligo is an acquired, auto-immune chronic skin disorder with different treatment modalities. Insufficient adherence to treatment is closely related to the efficacy of a prescribed treatment, and also, there are some associations between adherence behaviour and personality. Therefore, the study aimed to assess a relationship between five-factor personality traits and treatment adherence in patients with vitiligo.

**Methods:** In this cross-sectional study, patients with vitiligo who received Ultraviolet B (UVB) phototherapy were recruited. The Morisky Medication Adherence Scale (MMAS-8) assessed treatment adherence, and personality factors were evaluated by NEO Five-Factor Personality Inventory (NEO-FFI). Data were analysed using t-tests, correlations, and multiple regression.

**Results:** Among 70 participants, 62.9% had low adherence, 24.3% had medium adherence, and 12.9 % had high adherence. There was a positive correlation between neuroticism ( $p < 0.001$ ) and adherence score. Furthermore, a negative correlation between Agreeableness ( $p = 0.13$ ), Conscientiousness ( $p < 0.001$ ), Openness to experiences ( $p = 0.005$ ), Extraversion ( $p < 0.001$ ), and adherence score was obtained. In the regression analysis method, only the factors of neuroticism ( $p < 0.001$ ) and openness ( $p = 0.001$ ), and conscientiousness ( $p = 0.016$ ) predicted the dependent variable (adherence score) at the significance level.

**Conclusion:** This study demonstrated that openness to experience and conscientiousness positively affected adherence, while Neuroticism negatively affected adherence. Considering these personality factors can effectively screen poor adherence and improve treatment adherence.

**Keywords:** Adherence, Personality, Traits, Vitiligo

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## Introduction

Vitiligo is an acquired, auto-immune chronic skin disorder presented by the development of white depigmenting macules consequential from an absence of epidermal melanocytes (1). According to previous research, the estimated prevalence is about 0.5 to 1% of the general population (1,2). Vitiligo looks to affect men and women equally, but the more recorded women designate the importance of cosmetic issues in women. The rate of occurrence is not different according to skin type or race; half of all patients get the disease before the 2<sup>nd</sup> decade of age (2).

The skin is the most observable organ that affects the appearance and has a significant role in sexual and social relationships. Patients with skin diseases like vitiligo, psoriasis, and acne, which impair appearance, may intensely suffer from social stigmatisation and psychosocial distress (3,4). Furthermore, to physical discomfort, such skin diseases may lead to negative emotions such as shame, lack of confidence, anxiety, and even depression and have a substantial effect on a patient's quality of life and bring social stigma (3,5,6). The psychosocial impact of vitiligo may differ by social context. It is considered a major medical condition in India that may even lead to social deprivation. While in Western-European countries, vitiligo is often considered a harmless, beautifying skin disorder, and less attention is paid to its treatment (7).

Vitiligo has different treatments; that include topical and systemic immunosuppressants like calcineurin inhibitors, corticosteroids, oral antioxidants, phototherapy, most commonly narrowband ultraviolet therapy (NB-UVB), and surgical alternatives for steady lesions (8). It frequently needs continuous treatment to attain optimal treatment outcomes, and successful treatment depends on the patient's adherence to the therapeutic regimen. Still, this lengthy treatment usually leads to unacceptable results as there is no known way to complete the repigmentation of the depigmented lesions. Thus, non-adherence is not unusual (8,9).

The topic of non-adherence to longstanding treatment, which is very important in treating chronic diseases, was mentioned by the World Health Organization (WHO) in 2010. In chronic diseases, non-adherence to treatment leads to poor clinical results in patients

and imposes costs on individuals and the health care system (10). Treatment adherence is affected by various factors and is a complex behaviour, including disease-related and patient-related factors (11). There are some relations between adherence behaviour and personality (12). Since treatment adherence is a complex multifactorial behavior, selecting a dependable and practical instrument for measuring treatment adherence is very important. Morisky Medication Adherence Scale (MMAS-8) is one of the most commonly used surveys to assess patients' compliance. The MMAS-8 contains eight items. The first seven questions are, Yes and No questions and the last of them is a 5-point Likert-scale rating developed in 2009 (13). Using the MMAS scale, 71% of the patients were reported as non-adherent to their medication in vitiligo (8).

Personality is not a fixed predictor of specific behavior, such as adherence behavior but is regarded as a tendency to such actions depending on the standing environmental or social situation or emotional state (12). One of the most repeatedly used questionnaires to define personality is the revised NEO personality inventory (NEO-PI-R). Neuroticism demonstrates grades of emotional stability, Extraversion estimates degrees of interpersonal interactions, openness defines interestedness to experience novel thoughts, agreeableness actions the quality of interpersonal orientation, and conscientiousness approximates motivation in goal-directed behavior (14).

Due to the effect of personality characteristics' adherence, behavior is not completely explored; consequently, the present study intended to determine whether an association exists between five factors of personality characteristics and reported adherence to treatment in vitiligo patients.

## Materials and Methods

This study is a cross-sectional study conducted in the phototherapy unit; at the Department of Dermatology, Faghihi Hospital, Shiraz, Iran. The Scientific Research Ethics Committees at the Faculty of Shiraz University of Medical Sciences accepted it, and agrees with the Declaration of Helsinki.

## Participants

Vitiligo patients who received Ultraviolet B (UVB)

phototherapy were enlisted from the outpatient clinics. Patients were between 18 to 60 years-old at the time of study and cognitively capable enough to complete the questionnaire. Patients who lacked literacy to answer the questions and/or a diagnosis of the skin or skin-related diseases or who did not want to participate in the study were excluded from the study. Patients were also asked about mental illnesses and extracted from their records. 70 patients were recruited in the study.

### **Data collection**

Face-to-face interviews were conducted with all the patients. First, detailed demographic data (including age, sex, educational status, duration of the disease, previous treatments, and comorbidity with other medical or psychiatric disorders) were collected from the patients. Then two structured questionnaires of MMAS-8 and NEO-FFI were used.

### **8-item morisky medication adherence scale (MMAS-8)**

Participants received the Persian form of the MMAS-8 to measure their adherence level to treatment. The MMAS-8 contains eight items. The first seven questions are Yes and No questions. The last of that is a 5-point Likert-scale rating that was developed in 2009, and MMAS-8 was first developed by Morisky *et al* (13) in 2008 and its reliability and validity to evaluate patient medication adherence in medical practice. Clinical research was studied in 2017 by Moon *et al* (15). The Persian version of MMAS-8 was utilized in the present study and the concurrent criterion method was used to assess the validity and reliability. Cronbach's alpha coefficient was reported as 0.72 in this study (16).

MMAS-8 is a structured self-reported questionnaire that is expanded from the broadly used 4-item Morisky Green and Levine adherence scale and results in better psychometric properties (Cronbach's alpha of 0.83 vs 0.61) (17). The scale consists of 8 closed-ended questions and Yes or No responses except the eighth question with 5-point Likert scoring (from never to all the time) (18).

### **NEO personality inventory (NEO-FFI)**

Patients completed the Five-Factor Model of the

NEO-FFI. NEO-PI was first developed by Costa *et al* in 1992 (14), and NEO-FFI was translated and adapted by Haghshenas in Iran. The Cronbach's alpha reported for the Iranian version differs from 0.86 to 0.92 (19).

The NEO-FFI is a short form of the NEO-PI-R, which measures as a continuous the five personality traits (Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness) that include 60 items (12 items for each personality area). The items are scored on a 5-point Likert scale ranging from 'strongly disagree=0' to 'strongly agree=4' (range 0 to 48). Cronbach's alpha for the five areas in this study ranged from 0.68 to 0.88 (20).

### **Statistical analysis**

Statistical analysis was performed by SPSS version 23. Descriptive statistics (frequency, mean, and standard deviation) were calculated. An Independent t-test was used to compare the demographic data. Relations between personality factors and the MMAS-8 were measured using Pearson's correlation coefficient and multiple regression. Statistically, significance was considered for a p-value of less than 0.05.

### **Results**

In the present study, 70 patients were recruited; 44.4% were women, and 55.7% were men. The age of patients ranged from 18 to 68 years old, and the mean age was based on patients' demographic data and clinical features. All features of the patients are accessible in table 1.

Phototherapy alone was used for treating 58.6% of the participants in this study and 41.4% with a combination of phototherapy and medication; 27.1% of the patients had comorbidities.

Among patients, 62.9% presented with low adherence, 24.3% had medium adherence, and 12.9% had high adherence. There was no significant connection between age and adherence score ( $p=0.652$ ). The mean adherence score for men was  $2.97\pm 1.69$  and  $2.80\pm 1.70$  for women, which were not statistically significant ( $p=0.687$ ). No significant relationship was observed between education level and adherence score ( $p=0.690$ ). Also, there was no significant association between the duration of the disease and the mean adherence score ( $p=0.846$ ).

**Table 1.** Demographic data and clinical characteristics

	Study population N=70	Percent
Age mean (Yrs.)	40.47±12.40	
Sex		
Male	39	55.7
Female	31	44.3
Marital Status		
Married	55	78.6
Single	14	20
Other	1	1.4
Education Level		
Low	9	12.8
Medium	37	52.8
High	24	34.3
Occupation		
Employed	34	48.6
Unemployed	21	30
Retired	10	14.3
Student	5	7.1
Treatment type		
Phototherapy	41	58.6
Combination	29	41.4
Substance history		
Positive	10	14.3
Negative	60	85.7
Vitiligo family history		
Positive	15	21.4
Negative	55	78.6
Comorbidity		
Positive	19	27.9
Negative	61	87.1

Five domains of personality were evaluated with NEO-FFI. The results of this study demonstrated a positive relationship between neuroticism ( $p<0.001$ ) and adherence score. Also, a negative correlation between Agreeableness ( $p=0.13$ ), Conscientiousness ( $p<0.001$ ), Openness to experiences ( $p=0.005$ ), Extraversion ( $p<0.001$ ), and adherence score was obtained. Associations among the five personality traits and adherence scores (MMAS-8) are shown in table 2.

For the prediction of each of the personality factors from the variable of adherence score, the regression analysis method was used that the regression ratio to the residual was significant, but only the factors of neuroticism ( $\beta=0.103$ ,  $p<0.001$ ), openness ( $\beta=-0.111$ ,  $p=0.001$ ), and conscientiousness ( $\beta=-0.059$ ,  $p=0.016$ ) predicted the dependent variable at the significance level.

### Discussion

The results of the presented study displayed that most of the participants have poor adherence; medium and high adherence was less prevalent. This finding is similar to other studies, one evaluating vitiligo patients and some evaluating other chronic diseases (8,12). We conducted this study in Iran, a developing country, and studies have represented that the rate of non-adherence to treatment is higher in developing countries (21). Gender, age, educational level, and duration of illness were not significantly related to adherence. But other studies have revealed an association between age, gender, and educational status with adherence (22,23). The reason for the lack of relationship between age and treatment in our study in comparison with other studies can be attributed to the age range of vitiligo patients in the study, which in our sample ranges from young to old and, generally, the onset of vitiligo is a young age (6). The results of other studies about adherence in different gender are inconsistent (8,24). Like our study, a meta-analysis by

**Table 2.** Correlation between personality factor and MMAS-8 score

	Neuroticism	Extraversion	Openness to experience	Agreeableness	Conscientiousness
Adherence (MMAS-8)	0.49 **	-0.36 **	-0.33 **	-0.29 *	-0.44 *

\*= $p<0.05$  \*\*= $p<0.01$ , MMAS-8 Morisky Medication Adherence Scale.

Maged Hassan *et al* found no significant association between educational level and adherence in asthmatic patients (22).

Regarding the core aim of the current study to measure the effect of personality factors on adherence, neuroticism correlates with poor adherence (higher adherence score on the Morisky test). Conscientiousness and Openness to experience were associated with good adherence. The effect of Neuroticism was more than Openness to experience, and the Openness to experience effect was more than Conscientiousness. Extraversion and Agreeableness were not identified as predictors of adherence score in the multiple regression model. Until now, no previous study has specifically appraised the relationship between personality factors and adherence in vitiligo patients, but some studies have evaluated this relationship with other chronic diseases (12).

In majority of the studies, there was a positive association between Conscientiousness and adherence, but this connotation was negative between Neuroticism and adherence in various diseases such as asthma, multiple sclerosis, hypertension, and diabetes (12,25-28). Neuroticism tends to engage in behaviors that are more dangerous to their health, such as a tendency to smoke (29) and poor adherence to disease management recommendations (25). Notwithstanding this health-risk behavior, this personality trait is related to recurrent healthcare use. Such individuals tend to pay more attention to physical symptoms, contrasting with our findings (30). For patients with high scores of Conscientiousness, this change in high adherence may be explained by their tendency to have high confidence in their ability to manage their lives (31). Data about the association of other personality factors with adherence were inconsistent (32). People with high Conscientiousness have more discipline and more self-control. They also behave more organized and more reliably. These characteristics can facilitate task-directed behavior like adherence

(32,33). Neuroticism trait is related to emotional instability, and people with high Neuroticism are more vulnerable to depression and anxiety, which can lead to poor adherence (32).

In the present study, adherence was examined by MMAS-8, which was a self-report measure. Although self-reported measures are noninvasive and inexpensive, it is better to conduct studies with objective and subjective measures to evaluate adherence more accurately in the future. Another limitation of this study is that we did not assess vitiligo patients who received only pharmacotherapy and just assessed patients who were on more complex treatments like phototherapy.

This study had several limitations; firstly, the number of samples was low; secondly, due to the stigma of skin diseases, the willingness of patients to participate in the study was low.

## Conclusion

This study demonstrated that multiple personality factors could influence treatment adherence in vitiligo patients. Openness to experience and Conscientiousness positively affected adherence, while Neuroticism negatively affected adherence. Considering these personality factors can effectively screen poor adherence and improve treatment adherence.

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## Conflict of Interest

The authors have no conflicts of interest to announce.

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