# PERSONALITY TRAITS AND MEDICATION ADHERENCE IN PATIENTS WITH MIGRAINE: A NON-SYSTEMATIC REVIEW

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**Abstract**
**Introduction:** Treatment non-adherence is a highly recognized reason of efficacy failure of medical treatments. Causes of non-adherence in chronic migraine treatment may include personality traits. Studies of personality traits may help in individualizing our treatment plans. **Methods:** An electronic search in the National Center for Biotechnological Information's National Library of Medicine. All relevant results were to be selected for presentation and critical discussion. **Results:** The search for studies of any type using all three keywords < (personality traits) AND headache AND (adherence OR compliance)> that was performed on May 23, 2024 retrieved 5 hits, of which 3 were considered relevant to our question. **Discussion**: The retrieval rate of studies specifically relevant to our clinical question was very low, however some raw assumptions can be made and possible future approaches can be suggested. Investigating personality traits that correlate with adherence to prophylactic treatment for migraines is a complex endeavor as revealed in the low volume of related research. It certainly can be approached from several angles; psychological, demographic, or neurophysiological. **Conclusion**: Much more relevant and interdisciplinary research regarding understanding and management of the highly burdensome problem of non-adherence to migraine prophylactic treatments is urgently needed.

**Keywords**: personality, adherence, compliance, migraine, headache

# ΧΑΡΑΚΤΗΡΙΣΤΙΚΑ ΠΡΟΣΩΠΙΚΟΤΗΤΑΣ ΚΑΙ ΣΥΜΜΟΡΦΩΣΗ ΜΕ ΤΗ ΦΑΡΜΑΚΕΥΤΙΚΗ ΑΓΩΓΗ ΣΕ ΑΣΘΕΝΕΙΣ ΜΕ ΗΜΙΚΡΑΝΙΑ: ΜΙΑ ΜΗ ΣΥΣΤΗΜΑΤΙΚΗ ΑΝΑΣΚΟΠΗΣΗ

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**Εισαγωγή:** Η μη συμμόρφωση στη θεραπεία είναι ένας ευρέως αναγνωρισμένος λόγος αποτυχίας της αποτελεσματικότητας των φαρμακευτικών θεραπειών. Οι αιτίες της μη συμμόρφωσης στη χρόνια θεραπεία της ημικρανίας μπορεί να περιλαμβάνουν τα χαρακτηριστικά της προσωπικότητας. Μελέτες των χαρακτηριστικών της προσωπικότητας μπορούν να βοηθήσουν στην εξατομίκευση των θεραπευτικών μας σχεδίων. **Μέθοδοι:** Ηλεκτρονική αναζήτηση στο National Center for Biotechnological Information's National Library of Medicine. Όλα τα σχετικά αποτελέσματα επρόκειτο να επιλεγούν για παρουσίαση και κριτική συζήτηση. **Αποτελέσματα:** Η αναζήτηση μελετών οποιουδήποτε τύπου χρησιμοποιώντας και τις τρεις λέξεις-κλειδιά < (personality traits) AND headache AND (adherence OR compliance) > που πραγματοποιήθηκε στις 23 Μαΐου 2024, ανέσυρε 5 αποτελέσματα, από τα οποία 3 θεωρήθηκαν σχετικά με το θέμα μας. **Συζήτηση:** Ο ρυθμός ανάσυρσης μελετών που σχετίζονται ειδικά με την κλινική μας ερώτηση ήταν πολύ χαμηλός, ωστόσο μπορούν να γίνουν κάποιες αδρές υποθέσεις και να προταθούν πιθανές μελλοντικές προσεγγίσεις της έρευνας. Η διερεύνηση των χαρακτηριστικών της προσωπικότητας που συσχετίζονται με τη συμμόρφωση στην προφυλακτική θεραπεία για ημικρανίες είναι μια σύνθετη προσπάθεια, όπως αποκαλύπτεται από τον χαμηλό όγκο των σχετικών ερευνών. Μπορεί να προσεγγιστεί από τρεις κύριες οπτικές: ψυχολογική, δημογραφική και νευροφυσιολογική. **Συμπέρασμα:** Είναι επειγόντως απαραίτητη πολύ περισσότερη σχετική και διεπιστημονική έρευνα σχετικά με την κατανόηση και τη διαχείριση του ιδιαίτερα επιβαρυντικού προβλήματος της μη συμμόρφωσης στις προφυλακτικές θεραπείες για την ημικρανία.

**Λέξεις κλειδιά**: χαρακτηριστικά προσωπικότητας, συμμόρφωση, κεφαλαλγία, ημικρανία

## Introduction

Treatment non-adherence (a term interchangeably used with the term non-compliance) is usually defined as taking medication at a dose different to more than 20% of the prescribed dose, and it usually refers to taking less. Types of non-adherence include, among others, premature discontinuation of treatment, prescription filling but not execution, taking the wrong dosage, taking medication at incorrect times, increasing or decreasing the frequency of doses, and voluntary intermittent intake.[1]

The non-adherence rate in general is reported to range between 50-60% for long-term medication treatments and lower, between 20-30% for short-term treatments. Non-adherence to lifestyle changes is reported to be the highest, at 70-80%.[2] In patients with chronic headache, non-adherence to prescribed medication treatments may be one of the highest reported, at a rate of 50–60%.[3]

The World Health Organization (WHO) distinguishes non-adherence factors into patient-related (e.g., self-efficacy), healthcare system-related (e.g., trust in the doctor and treatment), treatment-related (e.g., strong burden of side effects), condition-related (e.g., comorbidities), and socioeconomic (e.g., low socioeconomic status).[1]

Non-adherence can vary with time. According to a study regarding acetylsalicylic acid,[4] four typical types of non-adherence patients are distinguished: those who do not adhere from the beginning (40.2%), those who stop adhering along the way (13.6%), those who start adhering along the way (9.6%), and those who adhere throughout the treatment (36.6%).

Medical non-adherence has been recognized as a major public health problem that imposes significant economic burden on modern healthcare systems. The estimated total cost ranges from $100 billion to $290 billion in the United States, €125 billion across Europe, and AU $7 billion in Australia, as of 2010. In a cross-sectional analysis to explore the effects of headache frequency and preventive medication failures on the quality of life and economic burden in European migraine sufferers,[5] data from 1106 individuals indicated that those with two or more medication failures had worse physical and mental health outcomes, greater functional impairment, and higher net healthcare costs compared to those with fewer or no failures.

But how may migraine differ or not from other chronic medical conditions regarding non-adherence? Commonly, subjectively reported causes of non-adherence in chronic migraine treatment may be related to side effects, unsatisfactory treatment efficacy, forgetting to take medication including due to complexity of instructions, difficulty in scheduling appointments at headache clinics, premature discontinuation due to improvement, and other reasons.[3]

Calling patients to remind them of appointments and recalling those who miss a scheduled appointment, simplified and tailored medication regimens (e.g., minimized number of medications and dosing, fixed-dose combinations, cue-dose training, stimulus control), and screening and management of psychiatric comorbidities, especially depression and anxiety are considered as proactive measures to prevent non-adherence.[3]

Anxiety and depression are especially relevant as migraines are often comorbid with anxiety and depression.[6] However, on top of that, personality traits like impulsivity, neuroticism, or negativism may obviously be an important factor for self-care, including adherence to the treatment of chronic debilitating-but-not-life-threatening medical conditions such as migraine.

It is important to consider that personality traits are enduring patterns of thoughts, feelings, and behaviors that differentiate individuals from one another, which are relatively stable over time and across situations, while, on the other hand, personality disorders are enduring patterns of behavior, cognition, and inner experience that deviate significantly from the expectations of an individual's culture, that are inflexible, pervasive, and lead to significant distress or impairment in social, occupational, or other areas of functioning.[7]

## Methods

An electronic search in the National Center for Biotechnological Information's National Library of Medicine using the keywords 'personality traits' AND headache AND (adherence OR compliance) was performed. This search may be used as a sample to lead a systematic review in the future. We preferred the broader term 'headache' instead of 'migraine' in order to include studies all over the medical specialties and disciplines. All relevant results were to be selected for presentation and critical discussion.

## Results

The search for studies of any type using all three keywords < (personality traits) AND headache AND (adherence OR compliance)> that was performed on May 23, 2024 retrieved 5 hits, of which 3 were considered relevant to our question.

The first one (Pain Medication Beliefs in Individuals with Headache), to evaluate beliefs about pain medication among individuals suffering from headaches, was a cross-sectional study that analyzed data from 215 adults with headaches using the Pain Medication Attitudes Questionnaire (PMAQ) and other psychological assessments. Participants were categorized

into three groups based on their medication beliefs: "trusting and unconcerned," "skeptical and somewhat worried," and "skeptical and concerned." Higher levels of mistrust and concerns correlated with increased depressive symptoms. Beliefs about pain medications varied widely among headache sufferers, influencing their adherence to medication. Negative beliefs were associated with higher levels of depression, highlighting the need for tailored approaches to address it.

The second study (Evaluation of Attachment Style and Social Support in Patients With Severe Migraine), aiming to describe social support and attachment styles among migraine patients and their impact on doctor-patient relationships and treatment adherence, assessed migraine impact, disability, and various psychological factors on 101 patients using validated questionnaires. Migraine patients had an overrepresentation of insecure attachment styles and lower levels of social support compared to the general population. Attachment style and social support influenced the therapeutic alliance and treatment adherence. The conclusion was that personalized treatment plans considering attachment styles and social support can improve patient care. Support groups are recommended to enhance social support systems for migraine patients.

The third study (Barriers to Behavioral Treatment Adherence for Headache: An Examination of Attitudes, Beliefs, and Psychiatric Factors) aimed to identify psychological factors contributing to low adherence to non-pharmacological treatments for headaches. It was conducted as a narrative review by an interdisciplinary team who examined various psychological factors affecting treatment adherence. Factors such as attitudes, beliefs, motivation, locus of control, self-efficacy, and psychiatric comorbidities were identified as barriers to adherence. The study concludes that addressing these psychological barriers through assessment and intervention can enhance adherence to behavioral treatments, ultimately improving outcomes for headache patients.

## Discussion

The retrieval rate of studies specifically relevant to our highly relevant clinical question was very low, however some raw assumptions can be made and possible future approaches can be suggested.

Studies demonstrate a number of methodological shortcomings in general headache adherence research so far.[8] Investigating personality traits that correlate with adherence to prophylactic treatment for migraines is a complex endeavor as revealed in the low volume of related research. It certainly can be approached from several angles—psychological, demographic, or neurophysiological—each offering unique insights.

### *Psychological aspect*

Specific psychological approach may be significantly facilitated by the largely established statistical model of "Big Five OCEAN Personality Type".[9] The five traits (Openness, Conscientiousness, Extroversion, Agreeableness, Neuroticism) can be associated with the adherence to migraine treatment and they can tailor adjustments to the doctor-patient communication and treatment plan.

Lower extraversion level has been found among patients with headaches, including both migraines and medication-overuse headache.[10] Extroversion may positively influence adherence to migraine treatment through strong social support networks, effective communication with healthcare providers, an active lifestyle, and a positive outlook. However, potential challenges such as balancing social activities and the need for immediate results must be addressed. Strategies like leveraging social support, enhancing communication, providing flexible treatment options, and setting realistic expectations can help optimize adherence for extroverted patients.

The severity of migraine disability, general health dimensions, and personality types in patients with and without aura was not different regarding high or low conscientiousness.[11] Conscientiousness may significantly enhance adherence to migraine treatment through organized planning, a strong sense of responsibility, goal-oriented behavior, and self-discipline. However, potential drawbacks like perfectionism and rigidity must be taken into consideration. By supporting their organizational skills, encouraging self-compassion, promoting flexibility, and setting realistic goals, healthcare providers can help conscientious individuals effectively manage their migraine treatment and improve their health outcomes.

Agreeableness may positively influence adherence through cooperative behavior, strong relationships with healthcare providers, sensitivity to others' expectations, and a tendency to seek support. Potential negative consequences are avoidance of confrontation and over-reliance on external validation to ensure sustained adherence. Encouraging open communication, building a support network, and educating patients can help leverage the strengths of agreeable individuals while mitigating potential barriers.

Neuroticism, with its emotional instability and anxiety, is expected to negatively affect adherence as those individuals may be more prone to worries about medication side effects or may have difficulty maintaining a routine and openness to experience, expected to have mixed effects. Given that stress and anxiety can trigger migraines, individuals high

in neuroticism may experience more frequent attacks, which could impact their ability to adhere to treatment plans. Their heightened sensitivity to symptoms and potential side effects might also influence adherence. [12]

Openness is an interesting personality trait; on one hand, individuals high in openness might be more willing to try and adhere to new treatments. On the other hand, their tendency to seek novelty might lead them to switch treatments frequently, reducing overall adherence. Openness may decrease the risk of co-occurrence of depression and migraine.[13]

***Demographic aspect***

Migraine sufferers who perceive the treatment as beneficial are more likely to stick with it. Surveys about patients' beliefs about the efficacy and necessity of the prophylactic treatment should thus be incorporated.[14]

Additionally, surveys of social support are valuable, including family and friends is an expected relevant factor, as strong social support networks can encourage adherence by providing reminders, emotional support, and practical help with managing medication schedules.[15]

Cultural beliefs about illness and treatment can also affect adherence. In some cultures, there might be a preference for alternative treatments, which can impact adherence to conventional medical regimens.[16]

On another demographic approach, the relationship between patients and their healthcare providers can be studied as it significantly influences adherence and effective communication, trust, and regular follow-ups can improve it.[17]

Income and education may also be evaluated, as higher income and education levels are often associated with better adherence, while these individuals may have better access to healthcare resources, greater health literacy, and fewer financial barriers to treatment. Individuals with lower socioeconomic status do not receive equal prescription medicine opportunities to manage their chronic pain conditions.[18] Moreover, stable living conditions with access to healthcare facilities and pharmacies make it easier for patients to adhere to treatment.[19] Besides those, the high cost of newer prophylactic medication against migraine (e.g. CGRP-related monoclonal antibodies, gepants, and ditans) can directly affect adherence, as the newer medications lead to better convenience, efficacy, and side effect profiles than the conventional pharmaceutical approaches, awaiting only regulations on compensation policies and cost and the final answers on long-term safety. [20] Surveys related to patients income may help to make a case for broader availability of expensive treatments as well as their price adjustments related to an enlarging market share.

***Neurophysiological aspect***

Studies might investigate imbalances in neurotransmitters like serotonin and dopamine, both of which may influence both migraine susceptibility and adherence to treatment. In general, dopamine seems to signal expectations and serotonin seems to signal the end results, which is highly relevant to medical treatments.[21]

Chronic stress is a known trigger for migraines, as well, making stress management crucial.[22] Adherence to prophylactic treatments may be influenced by the level of stress as determined by objective measurements of the slow response hypothalamus-pituitary-adrenal system and the fast response sympathetic-adreno-medulla system. [23]

Perhaps the psychological approach is the most directly relevant and impactful one for understanding and proactively improving adherence to migraine prophylactic treatments. Personality traits are crucial in determining how well patients stick to their treatment plans and intrinsically linked to the daily experiences and challenges of managing migraine.

In conclusion, as it had already been concluded one decade ago, future research should use objective measures of adherence, examine demographic, psychological, and behavioral correlates of adherence and examine the efficacy of adherence interventions in individuals with headache.[8] We highlight that much more relevant and interdisciplinary research regarding understanding and management of the highly burdensome problem of non-adherence to the migraine prophylactic treatments is urgently needed.

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