

Understanding the Relationship between Migraine and Neuroticism

Subjects: Psychology

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Headache is the first cause of consultation in neurology, and one of the most frequent reasons for consultation in general medicine. Migraine is one of the most common, prevalent, and socioeconomically impactful disabling primary headache disorders. Neuroticism can be conceptualized as a disposition to suffer anxiety and emotional disorders in general. Neuroticism has been associated with various mental and physical disorders (e.g., chronic pain, depression), including migraine.

Keywords: migraine ; neuroticism ; chronic pain

1. Introduction

Headache is the first cause of consultation in neurology, and one of the most frequent reasons for consultation in a general medicine office ^[1]. They are classified as primary when there is no organic or other known reason, and secondary when there is an organic sign. Among the primary headaches are migraine, tension-type headache, cluster headache (acuminate, histamine, or Horton), and others not classified within the aforementioned types ^{[2][3]}. Although tension-type headache seems to be the most frequent in daily practice, it is no less true that migraine is precisely the most disabling from the social, economic, and psychological points of view ^{[1][2][3][4]}.

In effect, migraine is one of the most common disabling primary headache disorders and several epidemiological studies have confirmed its high prevalence and negative socio-economic and personal impact (i.e., problems at work, in relationships, in academic field, in social spheres, etc.) ^[5]. In the 2010 Global Burden of Disease Study (GBD), migraine was ranked as the third most prevalent disorder in the world. Some years later, in the 2015 GBD, it was the third highest cause of disability worldwide in both males and females under the age of 50 years ^[6]. The evident burden of headaches provoked a call to action by the World Health Organization (WHO) in different years (i.e., 2004, 2011). On purpose, WHO, in association with the non-governmental organization Lifting the Burden, participates in the Global Headache Campaign. This initiative, launched in 2004 and still active today, aims to raise awareness of the problem and also improve the quality of care and access to it provided to people with headaches worldwide ^[6].

In addition, personality remains as a central aspect in psychology and therapy. One possible explanation factor is the need to consider the personality traits (i.e., habitual patterns of behavior, thought, and emotion such as neuroticism, psychoticism, extraversion, coping strategies, etc.) in the treatment of each disease ^{[7][8]}. By including personality traits in treatment and management of illnesses, it would make possible a more personalized approach for these patients and it seems to be related to a reduction of medication overuse ^[8]. In this sense, neuroticism is one of the most studied personality traits due to its implications for the health, not only mental but also physical ^{[8][9]}. Neuroticism can be considered as a disposition to suffer anxiety and emotional disorders in general ^[10]. Moreover, neuroticism has been associated with various mental disorders (especially anxiety and depression), the morbidity and mortality of various physical diseases (including migraine, fibromyalgia, rheumatoid arthritis, temporomandibular disorder), a greater number of medical complications, increasing frequency of health services use, and worse prognosis and health-related quality of life ^{[9][11][12][13][14]}. Moreover, it is important to notice that migraine patients usually show higher level of neuroticism and vulnerability to experience negative affect, compared to non-migraineurs patients ^{[15][16][17][18][19][20][21]}.

2. Insights into Neuroticism

Neuroticism is a dimension related to the disposition to suffer what classically is known as neurotic disorders, including both anxiety and emotional disorders in general. An individual with high neuroticism tends to be anxious, depressed, tense, irrational, shy, sad, emotional unstable, and distinguished by low self-esteem and frequent feelings of guilt as well ^[10]. In

general, neuroticism is characterized by emotional instability, fear, nervous disposition, insecurity, temperamental behavior, impatience, self-consciousness, and impulsive behavior [22][23].

The possible neurobiological bases of neuroticism include the visceral brain (or limbic system), composed by structures such as the medial septum, hippocampus, amygdala, cingulum, and hypothalamus [10][24]. The limbic system comprises a group of structures, including those in the limbic lobe and Papez circuit, which are anatomically interconnected and are probably involved in emotion, learning, and memory [25][26].

There is no doubt about the importance of continuing to investigate the health implications of neuroticism. Neuroticism has been identified as a strong correlate and predictor of various mental disorders (especially depression and anxiety) and the morbidity and mortality of various physical diseases (i.e., diabetes, cardiovascular disorders, dermatological, respiratory and gastrointestinal problems, fibromyalgia, temporomandibular disorder, chronic pain in general, and even cancer) [9][11][13][27]. Furthermore, the comorbidity among the above reported diseases and neuroticism has been suggested to lead to a greater number of complications, an increase in the frequency of use of health services, worse prognosis, and lesser health-related quality of life [11][12]. Neuroticism has also been considered a risk factor for developing Post-Traumatic Stress Disorder (PTSD) [28][29][30][31] and chronic pain in general (i.e., fibromyalgia, rheumatoid arthritis, etc.) [11][14][27].

Moreover, personality seems to determine the coping strategies that people will use in stressful situations, being those, in turn, that will allow the subject a high or low level of adaptation. The studies that are framed, assuming these statements, evaluate the possible relationship between the levels of a certain dispositional personality variables and the use of certain coping strategies. Specifically, these studies try to determine whether certain variables of personality lead to use coping strategies that at the same time lead to a low level of adaptation to the disease [14]. In this sense, most of the research has focused on neuroticism, and the results show the existence of a significant relationship between high levels of neuroticism and coping strategies that predict poor adaptation to the disease [8][9][13][27]. Thus, empirical evidence has been found that supports an increase in the probability of using ineffective coping strategies for stress management by subjects with high scores in neuroticism, such as, for instance, catastrophizing. High levels of neuroticism might be also be related to pain catastrophizing and a more passive-oriented stress and pain coping strategies [9][32][33][34]. At the same time, passive coping strategies predict higher perceived pain intensity [14][35]. In addition, the relation between neuroticism and chronic pain is mediated by the propensity of high-neuroticism individuals to catastrophize their pain [14]. At this regard, catastrophizing appears to reduce the health-related quality of life and worsen symptoms in several chronic pain conditions, such as fibromyalgia [7][36][37] and migraine [38][39][40]. Therefore, exploring neuroticism is useful in order to better understand the pain coping strategies and improve them and the treatment of these patients.

In the same line, it has been reported that the use of maladaptive coping strategies and some personality characteristics such as neuroticism and the presence of personality maladjustments can be considered vulnerability factors for a worse evolution in general and specifically in adaptation disorders. In fact, it seems that the use of these types of coping strategies modulates the relationship between neuroticism and psychological distress [34]. Therefore, they should be considered both in the evaluation and in the development of preventive or intervention strategies, which should be prioritized in people with psychological disorders (i.e., adaptation disorder) that present these characteristics [41].

3. Migraine and Neuroticism

Related to the main objective of this current review, which refers to exploring in depth the relationship between migraine and neuroticism, many affected headache patients show a tendency to experience more negative emotions and stress. This is in line with previous studies, which compare chronic headache patients to healthy controls [42]. Several researchers have studied the relation between migraine and neuroticism based on the Five Factor Model personality approach, which is a hierarchical system of personality in terms of five basic independent domains: neuroticism, extroversion, openness to experience, agreeableness, and conscientiousness. In this frame, neuroticism is conceptualized as the tendency to experience negative emotions, such as anxiety, fear, and frustration [43]. Additionally, some researchers—based on the Minnesota Multiphasic Personality Inventory (MMPI)—have found the “neurotic triad,” which includes hypochondria, hysteria, and depression, in tension-type headache and migraine patients [44]. Furthermore, it has been confirmed that migraine patients have significantly higher levels of neuroticism scores than non-migraine controls, using the Eysenck Personality Questionnaire (EPQ), which assesses neuroticism, extraversion, and psychoticism, together with a Lie/Social Desirability scale [45][46][47].

According to the research evidence, migraine patients usually have a higher level of neuroticism and vulnerability to negative affect, in comparison with non-migraineurs patients [15][16][17][18][19][20][21]. These findings and personality

characteristics described are usually associated and are more evident in the cases of greater intensity, duration in time, and frequency of migraine attacks [48]. For that reason, some studies suggest that this type of personality trait is more related to chronic pain than to migraine itself [48][49]; hence, the importance of treating migraines early and properly. Nevertheless, it is a theme still under research and no clear data have been provided at all. What is evident is that migraineurs studies showed a strong correlation between neuroticism and headache duration [50], though, indeed, when it includes males, no association with duration is found [15]. In the same way, a research comparing migraineurs to their siblings without migraine reported that neuroticism was not associated with attack frequency or severity [51]. Moreover, migraine in childhood diagnosed by physicians and higher trait neuroticism have been significantly related to the prevalence of migraine in adulthood [52]. In fact, neuroticism seems to increase the risk of migraine [53].

A high neuroticism score predisposes to depression and anxiety [16][54], which is clinically interesting, because medication-overuse headache migraine (MOH) patients are diagnosed with depression more frequently than migraineurs [16][55][56].

Previous studies have stated a strong association between high score on the personality domain neuroticism and depression [54]. Although, both migraine and MOH patients have increased risk of developing depression, medication-overuse headache migraine patients have a higher prevalence of depression compared to migraine patients in general [55]. The personality domain neuroticism (risk factor) and extraversion (protective factor) have been linked to general health [57]. A high score on neuroticism has been linked to poor prognosis and health-related quality of life in migraine patients [15][58][59]. The previous research revealed that neuroticism moderated the relationship between depression and migraine [20].

Neuroticism has been also studied in migraine patients compared to tension-type headache (TTH) patients [60]. In this sense, neuroticism and depression scores have been associated with headache frequency (chronic vs. episodic), being higher for migraine and TTH followed by pure TTH [60].

The relation between depression and neuroticism in migraine is an important element. Some authors consider that both neuroticism and depression may influence pain sensitivity and pain perception thresholds in humans [61][62][63][64]. In addition, it is well-known that personality traits may affect the individual's vulnerability and the use of non-adaptive coping strategies facing various types of disease, including pain conditions [37]. In the same line, neuroticism seems to alter pain perception; lower pain thresholds have been found in persons with high levels of neuroticism in comparison with persons with lower levels of neuroticism [65]. Moreover, neuroticism has been related to greater vigilance to pain, pain catastrophizing, and fear of movement/re-injury in patients with non-specific chronic or recurrent pain [62]. Cutaneous allodynia, which may indicate central sensitization, has been shown to be associated with depression in migraineurs [66]. Moreover, depression has been revealed to be associated with an increased risk of transformation from episodic to chronic migraine [67], where neuroticism might be a mediator factor.

In general, migraine patients with comorbid depression and anxiety had more neuroticism than patients without migraines and those with depression or anxiety without migraines [68][69]. As neuroticism is significantly related to symptoms of anxiety and depression [70][71], treatment for migraine might be more effective if it included interventions such as cognitive behavioral therapy (CBT) [72]—which is considered one of the most effective interventions for depression—together with the usual medical treatment [73]. Nevertheless, it is important to be cautious in assuming that depression and neuroticism are related to migraine through the same mechanism. Given that neuroticism is a relatively stable aspect of an individual's personality, it seems likely that genetically predisposed people will show a certain level of neuroticism throughout their lives, and throughout their lives, at some point, may develop migraine, possibly under the influence of different factors (i.e., hormonal changes and environmental stressors) [53]. By contrast, anxiety and depressive disorders are usually episodic and the mechanism that causes their association with migraine may be different [53].

In fact, it is well-known that personality traits (especially neuroticism) and childhood maltreatment have been independently associated with several negative health outcomes later in life, including migraine [74]. These results are in line with the previous evidence in which personality traits, especially neuroticism, are mediators for the relationship between childhood maltreatment and several mental health variables (i.e., depression, psychological distress, anxiety, substance abuse, alcohol dependence, etc.) [75][76][77][78][79][80][81][82][83]. In this sense, it has been stated that the presence of an overlap in the neural circuitry underlying experiences of physical pain and social pain (e.g., by childhood maltreatment), and understanding social pain as the painful feelings following social rejection or social loss [84]. There is also evidence of neuroticism as a potential mediator for the relationship between childhood abuse and migraine. These results have been confirmed through direct and indirect statistical analyses [74]. The relationship between migraine/headaches and childhood abuse has been established in large non-clinic-based samples together with several small case control studies using clinic and non-clinic-based sampling frames [85][86][87][88][89][90][91][92].

Lastly, it is relevant to mention that neuroticism seems to be also associated with the ability of old women to endure migraine pain [93]. Some authors propose that the theoretical construct of neuroticism implies that people with a high degree of neuroticism are more sensitive and vulnerable to various stimuli, including pain. Therefore, old women with high levels of stress susceptibility and scoring high in somatic trait anxiety experienced more disability during attacks at low levels of migraine pain intensity, showing a vulnerability to migraine pain [93]. At the same time, it is important to note that ageing is characterized by a reduced ability to cope with challenges [94]. Old women with high levels of certain neuroticism-related personality traits showed difficulties in enduring migraine pain, and possibly a reduced ability to cope with the challenge of migraine pain, including pain of mild intensity [93]. Thus, more research is needed in this regard. The relation between neuroticism and migraine is complex and requires us to studied it more widely. **Figure 1** (elaborated by authors) shows the above reported most important elements for understanding the relation between migraine and neuroticism.

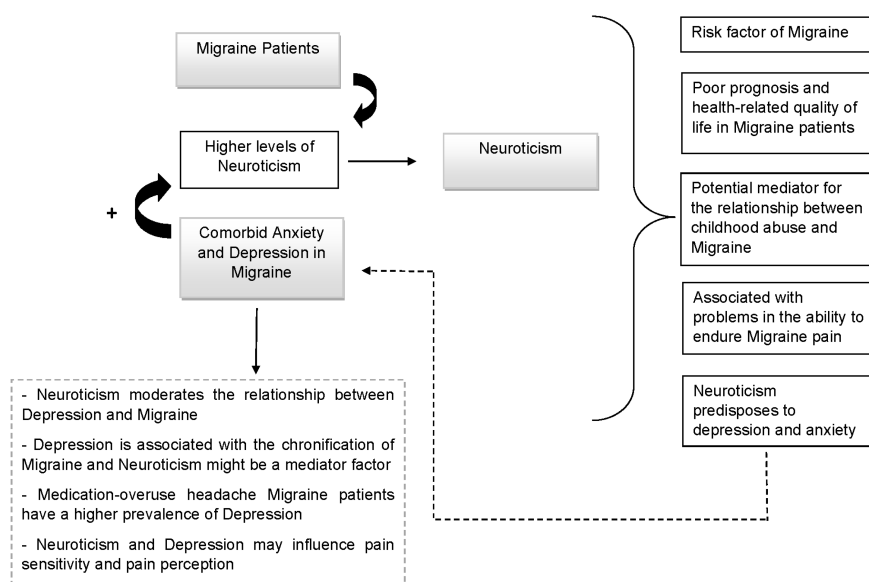


Figure 1. Migraine and Neuroticism.

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