

Exploring the Spectrum of Migraine: Beyond Auras and Multisensory Unusual Experiences

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Abstract:

The aim of this study is to compare the visual and non-visual aura experiences of migraine patients. By analyzing demographic data, pain intensity, attack frequency, and migraine-related disability, this research seeks to identify patterns and differences in sensory experiences among individuals diagnosed with migraine according to the International Headache Society criteria. This study involves 50 participants aged 18 to 56 years who have experienced unusual sensory experiences in the auditory, visual, olfactory, somatic-tactile, and gustatory domains. The findings will provide insights into the relationship between different types of aura experiences and various demographic and clinical factors, contributing to a deeper understanding of migraine pathology and potentially informing better-targeted treatments and management strategies.

Key words: migraine; aura; visual; sensory; auditory; olfactory; somatic; gustatory

Introduction

Migraine aura, a phenomenon incorporating recurrent attacks of reversible visual, sensory, or other central nervous system symptoms followed by headaches, has drawn the attention of researchers for centuries. Characterized by recurring episodes of severe headache, often accompanied by sensitivity to light and sound, nausea, and vomiting, migraine can significantly affect an individual's quality of life and disability. While the International Classification of Headache Disorders provides a clinical definition, the pathophysiology of migraine aura remains a subject of ongoing debate and exploration (Schott, 2007). In the study titled Global Burden of Disease, migraine was ranked the 6th most commonly seendisabling condition and was reported to affect 14.4% of the global population (Stovner LJ et al., 2016). In a previous study, migraine was reported to cause a cost of € 27 billion annually in Europe (Olesen et al., 2003). In order to effectively address the problems arising from this disorder, it is very important to the basic mechanisms of migraine and optimize the migraine treatment accordingly.

In general, migraine can be divided into two categories, namely migraine with aura and migraine without aura (Headache Classification Committee, 2004). As stated by the Headache Classification Committee, migraine with aura can be defined as "therecurrent disorder manifesting in attacks of reversible focal neurologic symptoms that usually develop gradually over 5–20 minutes and last for less than 60 minutes" (Headache Classification Committee, 2004). Even though aura typically develops before the migraine headache, some patients may also have aura after the beginning of the headache. In previous studies, the prevalence of the migraine with aura was reported to be approx. 4% in Europe (Rasmussen

and Olesen, 1992; Nikiforow, 1981; Merikangas et al., 1990; Breslau et al., 1991; Russel et al., 1995). The aura symptoms include visual, sensory, speech, motor, brainstem, and retinal problems.

Similar to migraine without aura, migraine with aura is more commonly seen in women than in men. In a previous study, it was reported that 3.4% of men experienced migraine with aura, whereas the same rate was reported to be 7.4% for women (Breslau et al., 1991). Even though women experience migraine without aura more commonly than migraine with aura, the prevalence of migraine with aura and that of migraine without aura were reported to be similar in men (Rasmussen and Olesen, 1992; Nikiforow, 1981; Merikangas et al., 1990; Breslau et al., 1991; Russell et al., 1995). In a study carried out on the population in the USA, it was reported that 11.9 million individuals have aura (Rasmussen and Olesen, 1992). Besides that, the most common aura was reported to be the visual aura. In a previous study, it was stated that 99% of patients having migraine with aura reported experiencing visual aura (Russell and Olesen, 1996).

Aim

The aim of this study is to compare the visual and non-visual aura experiences of migraine patients. By analyzing the demographic data, pain intensity, attack frequency, and migraine-related disability, this research seeks to identify patterns and differences in sensory experiences among individuals diagnosed with migraine according to the International Headache Society criteria (Arnold, 2018). This study involves 50 participants aged 18 to 56 years who have experienced unusual sensory

experiences in auditory, visual, olfactory, somatic-tactile, and gustatory domains. The findings will provide insights into the relationship between different types of aura experiences and various demographic and clinical factors, contributing to a deeper understanding of migraine pathology and potentially informing better-targeted treatments and management strategies.

Material and Methods

The study included 50 individuals aged 18 to 56 years diagnosed with migraine according to the International Headache Society criteria (Arnold, 2018) and having experienced unusual sensory experiences. These comprised aura experiences in the auditory, visual, olfactory, somatic-tactile, and gustatory domains. Participants' demographic data (age, gender, marital status, education level), chronic disease history, frequency and duration of headaches, attack frequency, and attack severity were investigated. Attack severity was divided into mild, moderate, severe, and very severe. Attack frequency was divided into 1-2 per month, 3-4 per month, and more than 4 per month. Migraine-related disability status was assessed by using the Migraine Disability Assessment Scale (MIDAS) (Ertaş et al., 2004). In this study, visual and non-visual aura experiences of migraine patients were compared by making use of demographic data, pain intensity, attack frequency, and Migraine Disability Assessment (MIDAS) questionnaire.

Statistical Method

The data was analyzed using IBM SPSS V23. The normal distribution suitability was examined with the Shapiro-Wilk test. The Fisher-Freeman-Halton test was used for the comparison of categorical values between groups. The Mann-Whitney U test was used to compare non-normally distributed Midas values for binary groups. The significance level was set at $p < 0.05$.

Results

As seen in Table 1, the mean age of the patients is 36.26 ± 9.00 , with a median age of 35.00 (min. 20.00 - max. 56.00). Considering the gender distribution of participants, 54% of the patients involved in the present study were male, and 46% were female. Examining the marital status, the majority of the participants (78%) were married. Regarding the level of education, it was determined that 34% of the patients have received a university education or higher.

In the assessment of chronic illnesses, it was found that 86% of the patients do not have any chronic diseases. Analysis of the duration of headaches revealed that a significant portion of the patients (36%) have experienced headaches lasting longer than 24 hours. The severity of headaches was also examined, and it was found that 52% of the patients are affected by very severe headaches. Considering the frequency of headache attacks, the results achieved showed that a large portion of the patients (42%) experience attacks 1-2 times per month. Examining the MIDAS stages, it was found that the majority of patients are in stage 4 (38%). The MIDAS numerical value was determined to be 7.14 ± 1.25 , with a median of 7.00 (min. 5.00 - max. 10.00).

Assessing the presence of visual aura, auditory aura, taste aura, smell aura, and sensory/tactile aura, it was observed that the majority of patients do not experience these types of auras.

As seen in Table 2, there was no significant difference in the presence of visual aura by headache severity ($p=0.759$). Visual aura was observed in 20% of those with moderate headache, 42.1% of those with severe headache, and 34.6% of those with very severe headache. Similarly, no significant difference was found in the presence of auditory aura by headache severity ($p=0.727$). Auditory aura was observed in 20% of those with moderate headache, 15.8% of those with severe headache, and 11.5% of those with very severe headache.

There was no significant difference also in the presence of gustatory aura by headache severity ($p=0.376$). Gustatory aura was observed in 20% of those with moderate headache, 5.3% of those with severe headache, and 11.5% of those with very severe headache. In addition, no significant difference was found in the presence of olfactory aura by headache severity ($p=1$). Olfactory aura was observed in 0% of those with moderate headache severity, 10.5% of those with severe headache severity, and 11.5% of those with very severe headache severity.

Finally, there was no significant difference in the presence of sensory/tactile aura by headache severity ($p=1$). Sensory/tactile aura was observed in 20% of those with moderate headache severity, 26.3% of those with severe headache severity, and 30.8% of those with very severe headache severity.

As seen in Table 3, there was no significant difference in the presence of visual aura by attack frequency ($p=0.256$). Visual aura was observed in 28.6% of those having attacks 1-2 times a month, 31.6% of those having attacks 3-4 times a month, and 60% of those having 4 or more attacks a month. Similarly, no significant difference was found in the presence of auditory aura by attack frequency ($p=0.289$). Auditory aura was observed in 23.8% of those having attacks 1-2 times a month, 5.3% of those having attacks 3-4 times a month, and 10% of those having 4 or more attacks a month.

There was no significant difference in the presence of gustatory aura by attack frequency ($p=0.711$). Gustatory aura was observed in 14.3% of those having attacks 1-2 times a month, 10.5% of those having attacks 3-4 times a month, and 0% of those having 4 or more attacks a month. Besides, there was also no significant difference in the presence of olfactory aura by attack frequency ($p=0.197$). Olfactory aura was observed in 4.8% of those with attacks 1-2 times a month, 21.1% of those with attacks 3-4 times a month, and 0% of those with 4 or more attacks a month.

Finally, there was no significant difference in the presence of sensory/tactile aura by attack frequency ($p=0.778$). Sensory/tactile aura was observed in 33.3% of those having attacks 1-2 times a month, 26.3% of those having attacks 3-4 times a month, and 20% of those having 4 or more attacks a month.

As seen in Table 4, there was no significant difference in the presence of visual aura by stages ($p=0.795$). Visual aura was observed in 66.7% of MIDAS stage 1, 33.3% of stage 2, 31.3% of stage 3, and 36.8% of stage 4. Besides that, there was also no significant difference in the presence of auditory aura by stages ($p=0.923$). Auditory aura was observed in 0% of MIDAS stage 1, 8.3% of stage 2, 18.8% of stage 3, and 15.8% of stage 4.

The results reported in Table 4 also showed that there was no significant difference in the presence of gustatory aura by stages ($p=0.525$). Gustatory aura was observed in 33.3% of MIDAS stage 1, 8.3% of stage 2, 6.3% of stage 3, and 10.5% of stage 4. The results also indicate that there was no significant difference in the presence of olfactory aura by stages ($p=0.711$). Olfactory aura was observed in 0% of MIDAS stage 1, 16.7% of stage 2, 12.5% of stage 3, and 5.3% of stage 4. Finally, it was determined that there was no significant difference in the presence of sensory/tactile aura by stages ($p=1$). Sensory/tactile aura was observed in 33.3% of MIDAS stage 1, 25% of stage 2, 31.3% of stage 3, and 26.3% of stage 4.

Discussion

Migraine is a complex neurologic disorder that affects various systems of the central nervous system, including the autonomic, affective, cognitive, sensory, and motor systems. Approximately a quarter of migraine patients experience migraine aura, which involves diverse symptoms affecting different levels of the nervous system. The most common type of aura is visual, followed by sensory aura. However, motor deficits and impairments can also occur in higher cortical centers, leading to issues such as disrupted thinking, orientation, coherence, or concentration (Toh et al., 2024).

The systematic review appears to be centered on two key aspects, which are the phenomenological descriptions and clinical correlates. Phenomenological descriptions refer to exploring how individuals experiencing migraine describe visual and non-visual perceptual experiences. This could involve understanding the nature, duration, and characteristics of multisensory hallucinations or other unusual sensory phenomena during migraine episodes. Clinical correlates, on the other hand, refers to investigating associations or correlations between these visual and non-visual perceptual experiences and other clinical factors. This might include examining whether certain types of sensory experiences are more prevalent in specific subtypes of migraine, their relationship to headache characteristics, or any other relevant clinical factors.

In the present study, no statistical relationship was found between the presence of aura and the severity of headache. Similarly, in a previous study, Eriksen et al. (2005) reported that 94% of 362 individuals with severe familial migraine background experienced headache within 1 hour after the aura. In another study, headache and aura were reported to develop simultaneously in 4.7% of 148 patients (Russell and Olesen, 1996). Besides, it was determined in the present study that the majority of the patients involved in this study did not report an aura. However, in a previous study, the prevalence of migraine with aura among migraine patients was reported to range between 20% and 40% (Buse et al., 2013).

Conclusion

The results achieved in this study suggest that unusual olfactory, somatic-tactile, and gustatory experiences are common in migraine and may be clinically significant as aura symptoms. Increased awareness and effective management of these symptoms are essential for a comprehensive therapeutic approach to migraine.

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